TAMIL NADU G. D. NAIDU AGRICULTURAL UNIVERSITY

TWENTIETH ANNUAL REPORT

April 1, 1990 to March 31, 1991

ACKNOWLEDGEMENT

The whole hearted support of the Chancellor, the Pro-Chancellor, the Chief Secretary and the Secretaries to the State and Central Governments is gratefully acknowleged. The guidance from the members of Board of Management, Academic Council, Research Council, Extension Education Council and Regional Research Councils was of immense help in identifying new horizons of thought and action.

The University is thankful to the Indian Council of Agricultural Research and World Bank for their liberal grants sanctioned for the various developmental programmes. Thanks are due to the State Directorates of Agriculture, Oilseeds, Seed Certification, Agricultural Marketing and Horticulture, State Department of Forests, State Cinchona Department, State Planning Commission, Khadi and Village Industries Board, Government of India, Council of Scientific and Industrial Research, NABARD, Central Coir Board, Coffee Board, TNBCST, Ford Foundation, U.S.A., Rockfeller Foundation, U.S.A., International Food Policy Research Institute, U.S.A., International Foundation of Sciences, Sweden, Swedish International Development Authority, International Atomic Energy Agency, Vienna, International Development Research Centre, Canada, UNICEF, SPIC, IFFCO and various private industries and institutions which have extended financial assistance to the University for undertaking research in specific areas.

It gives immense pleasure to acknowledge the help and co-operation rendered by the officers, teachers, scientists, students, technicians and administrative and supporting staff who have helped in the successful and efficient running of the University. Thanks are due to them for their dedication and team spirit. The University considers as a pride to thank the farming community, agro-industrialists and general public of Tamil Nadu. The continued support received by this University from the people of the State and functionaries at various levels will help to build this institution as a centre of excellence in agricultural research, education, extension and training.

BOARD OF MANAGEMENT

Chairman - Vice-Chancellor	:	Dr. S. Jayaraj
Secretary to Government Agriculture Department and Agrl. Production Commissioner	:	Tmt. Latika D. Padalkar, I.A.S.
Secretary to Government Finance Department	:	Thiru N. Narayanan, I.A.S.
Director of Agriculture	:	Thiru Mohan Varghese Chunkath, I.A.S.
Director of Animal Husbandry	:	Dr S. Govindarajan, M.V.Sc.
Director of Fisheries	:	Thiru S. Machendranathan, I A.S.
Principal Chief Conservator of Forests	:	Thiru M. Harikrishnan, I.F.S.
Agricultural Scientist	:	Dr. G. S. Venkataraman
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Livestock Farmer	:	Thiru A. Balasubramanian, B.A. B.L.,
Agro-Industries	:	Dr. B. Vasantharaj David
Women Social Worker	:	Sr. Rita Thyveettil
Educationist	:	Dr. K. R. Ramaswamy
ICAR Nominee	:	Dr. S. Nagarajan
Member of Legislative Assembly	:	Thiru T. K. Subramanian, M.L.A.
Member - Secretary Registrar	:	Dr. A. Narayanan (upto 14.3.91) Dr. C. Ramaswami (from 15.3.91)

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1. INTRODUCTION

The twentieth Annual Report of Tamil Nadu G. D. Naidu Agricultural University covers the period from 1.4.1990 to 31.3.1991. The University continued to maintain steady progress during the year under report in all the three spheres of its mandate, viz., teaching, research and extension education. Masters' degree programme was started at Agricultural College and Research Institute, Killikulam in six disciplines, viz., Agronomy, Plant Breeding and Genetics, Soil Science and Agricultural Chemistry, Agricultural Entomology, Agricultural Economics and Agricultural Extension. A total of 74 staff members were admitted under faculty improvement programme as part time students for persecuting their post-graduate studies. During the year 24 new crop varieties were released for general cultivation. Besides releasing high yielding, pest and disease resistant and drought tolerant crop varieties, the university took special efforts to develop several cost-effective management technologies and also farm implements to reduce the cost of cultivation and to improve the efficiency of input. Techno-economic surveys were conducted at district level covering cost of cultivation of major crops, employment of rural labour force and on several farming components like agriculture, horticulture, sericulture, dairying, nutrition etc. Special schemes were operated to train women in enterprise management to encourage their participation in rural development. The educational programmes for both under-graduate and post-graduate courses were updated and refined to ensure a high degree of academic excellence.

The university through its sharp focus on need based, field oriented, location-specific research programmes and action plans has contributed substantially in the agricultural growth of the state. These programmes were applied in nature to ensure quick impact on rural economy. The concept of regionalisation of research, already given importance, was further strengthened through Regional Research and Extension Councils, agroclimatic zone based research programmes and formulation of time-bound research subprojects. Regional Research and Extension Councils and Scientific Workers' Conference provided excellent opportunities for close interaction between the scientists and extension staff and also helped to identify priority areas of research. The major areas of research that receive great attention include integrated nutrient management, integrated pest management, molecular biology and bio-technology, farming systems research, mixed farming, environmental science, dry farming, agro-foresty, sericulture, water management, designing and development of new farm implements and tools, women participation and social engineering and upliftment of scheduled

castes and other backward communities. Special emphasis is also being laid on "Mission Mode Research", which is an inter-disciplinary and problem oriented research approach to overcome the yield barriers in specific crops like rice, groundnut and pulses. The research capabilities of the university were further strengthened through inter-disciplinary research in collaboration with international institutes like International Rice Research Institute, Manila, Philippines, and national funding agencies like Indian Council of Agricultural Research, Government of India, Department of Science and Technology and Department of Biotechnology.

The valuable information generated was effectively disseminated through the Directorate of Extension Education and the various extension education centres such as Communication Centres, Krishi Vigyan Kendras, National Demonstration Centres and Plant Clinic Centres located at different agro-climatic zones of the state. Further, spread of information and feed back relating to problems arising from time to time were also channalised through Regional Research Councils and Research Councils involving representation of farming community, apart from senior officials of the development departments. Mass media like radio, television, newspapers and farm magazines were utilised to disseminate new technologies for agricultural production and allied fields. Apart from this, the university also conducts the regional level Farmers' Day, Field Day, training programmes, exhibitions and brings out many publications for the transfer of technology to Tamil Nadu farmers.

The university has a well organised seed production programme. Breeder seeds of various crops were produced under strict quality control towards meeting the entire needs of the state. The successive stage, viz., foundation, registered and certified class of seeds were produced by the development department of the state making use of the breeder seeds produced by the university.

The major achievements of the university in the fields of education, research and extension education are summarised below :

Education

* During the year 618 students were admitted in the under-graduate programmes and 350 students were admitted in the post-graduate courses in the four campuses of the university.

* New post graduate programmes leading to Ph.D. in forestry, environmental sciences and bio-technology were started.

* M.Sc. (Ag.) programme was started at Agrl. College and Research Institute, Killikulam in six disciplines, viz., Agronomy, Plant Breeding and Genetics, Soil Science and Agricultural Chemistry, Agricultural Entomology, Agricultural Economics and Agricultural Extension during the academic year.

* 73 staff members were admitted under faculty improvement programme as part-time students.

* During the academic year, College of Forestry was shifted from Coimbatore to Forestry Research Station, Mettupalayam and the B. Sc. (Hort.) under graduate programme was shifted from Coimbatore to Horticultural Research Station, Periyakulam.

* Self employment oriented courses were introduced.

* The academic activities and infrastructural facilities for the fourth Agricultural College at Kumulur, Lalgudi have been strengthened.

Research

The following new schemes were sanctioned during 1990 - 91.

University Plan Schemes

* Scheme for breeder seed production in groundnut, Vamban.
* Evolving new varieties and technology for high productivity in *Casuarina*, Vridhachalam.
* Evaluation of scented and non-scented rices, Aduthurai.
* Development of sorghum varieties for various industrial purposes, Vellore.
* Studies on the improvement and management of sweet oranges, Periyakulam.
* Mitochondrial DNA and proteins in cytoplasmic male steriles in sorghum, Coimbatore.
* Development of monoclonal antibodies for RTV in rice and CMV and BBTV in banana, Coimbatore.
* Technology development for wasteland reclamation in coastal area, Cuddalore.
* Mass production and quality control of biofertilizer, Paiyur.
* Studies on processing technology for soya based foods, Madurai.
* Establishment of seed technology unit, Killikulam.
* Resource inventory for Tamil Nadu using remote sensing technique, Coimbatore.

- Studies on seed crop management practices under dryland conditions, Aruppukkottai.
- Bio-fertilizer research for forest system in Western Ghats, Kodaikanal.
- Strengthening foliar diagnosis research to alleviate nutritional and physiological disorders in crop plants, Periyakulam.
- Causes for button shedding, nut shrinking and ill filling in coconut, Veppankulam.
- Studies on drought climatology, Trichy.
- Operational research on pests and diseases management in rice, Kattuthottam.
- Survey and management of pests of forests and forage trees, Mettupalayam.
- Teaching science and technology to farm women through video cassettes, Madurai.

Government of India schemes

- Chemical constituents of neem and karanja (pungam)kernels, Mettupalayam.
- Technology extension project on agro-forestry in farmers' fields, Mettupalayam.
- Establishment of centre for plant molecular biology (CPMB), Coimbatore.
- Exploitation of symbiotic nitrogen fixation of actinorhizal plants for afforestation and soil rehabilitation, Cuddalore.
- Scheme on the technology development and demonstration of bio-fertilizers-BGA (Blue Green Algae), Aduthurai.
- Scheme for production of foundation seed of chillies and minor spices, Bhavanisagar.
- Scheme for characterisation of transluscent prefab dome of fixed dome biogas plants in relation to selective electromagnetic wave length filtering and resulting response of microbes in general and methanogens in particular, Coimbatore.
- Selection and cloning of hyper ligninolytic *Streptomyces* sp for the conversion of lignin rich waste (Coir dust) to energy rich chemicals and humus like polycondensates, Coimbatore.

* Degradation of fatty acids by syntrophic cocultures in biogas digesters, Coimbatore.

* Central sector scheme - Production of fruits and vegetables, Periyakulam, Palur and Coimbatore.

ICAR Schemes

* Alternative model for T & V System, Coimbatore.

* Methodology for early detection of Thanjavur wilt of Coconut, Veppankulam.

* In vitro culture studies for improvement of banana clones, Coimbatore.

* First line demonstration on oilseed crops during rabi 90-91, Coimbatore.

* Front line demonstration in annual oilseed crops, Coimbatore, Aliyarnagar, Bhavanisagar, Tindivanam and Vridhachalam.

* Scheme for promotion of research and development efforts on hybrids in selected crops - Seed technology, Coimbatore, Castor - Tindivanam.

* First line demonstration on pulses (Rabi / Summer crop) - blackgram and greengram, Pudukkottai and Pattukotai.

* Studies on seed collection, processing and standardsation of storage practices in sylvicultural crops of economic importance, Mettupalayam.

Private Agency Schemes

* Developing Azospirillum and Azotobacter biofertilizers for mulberry, Paiyur.

* Investigation on the quantitative and qualitative increase in the yield of leaves of mulberry through micorrhizal inoculation, Paiyur.

* Research proposal in investigations on the polyhedrosis virus diseases in *Bombyx mori* and their manangement, Coimbatore.

* Studies on foliar application of micronutrients to mulberry and its effect on economic characters of silk worm, Coimbatore.

* Studies on the multi-residues of pesticides in spices and spice production, Coimbatore.

* Scheme for spices development in selected states, Coimbatore.

* Time bound projects in rural development, Madurai.

* Seed fortification and mid storage treatment for prolonging shelf life of crops, Coimbatore.

* Social forestry education through awarness compaigns - video teaching and direct training to farm women and youth, Coimbatore.

* Extension of agro-climatic regional exercise to districts in Tamil Nadu, Coimbatore.

* Transfer of biofertilizer technology of tree crops of social forestry programme for waste land improvement in certain selected areas of Tamil Nadu, Mettupalayam and Paiyur.

State Government Schemes

* Training programme on improved chulas in the department of bio-energy, Coimbatore.

* Strengthening of State Land use Board in Tamil Nadu G. D. Naidu Agricultural University, Coimbatore.

International Collaborative Schemes

* INDO-SAREC Project - stand alone fuel cell power plants for rural electrification in India, Coimbatore.

* Ford Foundation - Net work on scarce water management, Coimbatore.

* INSURF - Sub net work collaborative research on green manure development and utilisation for rice based cropping system, Coimbatore.

Varieties Released

Twenty four new crop varieties were released for general cultivation through the concerted efforts of the university as detailed below :

Rice	:	ASD 18	Muyal Masal	:	(*Stylosanthes scabra*)
		MDU 4	Bhendi	:	Co 3
Sorghum	:	CoH 4	Chilli	:	Co 3
		K 10	Butter Beans	;	KKL 1
		Paiyur 1	Colacasia	:	Co 1
Varagu	:	APK 1	Coleus	:	Co 1
Redgram	:	Co 6	Greater Yam	:	Co 1
Avarai	:	Co 12	Pitchi	:	Co 2
Lima Bean	:	LBS 1	Cashew	:	VRI 3
Cotton	:	SVPR 1	Coriander	:	Co 3
		Paiyur 1	Garlic	:	Ooty 1
Sugarcane		CoC 91061	Cumbu Napier Hybrid Grass	:	Co 2

Apart from varietal improvement, several new technologies were developed for increasing production and profit as detailed hereunder :

* In Periyar - Vaigai command area, groundnut and blackgram - rice - sesamum was found to be a viable system with high rice yield equvalent to 18.3 t/ha and a net income of Rs. 31,075 ha with 91 per cent additional income over the existing system of rice - rice - fallow.

* In Thanjavur New Delta area, application of Zn SO_4 @ 25 kg/ha in combination with 50 kg Fe SO_4/ha enhanced the rice yield to the tune of 16.4 per cent over NPK alone (4.59 t/ha).

* For lowland rice under Madurai condition, the new strain *Azospirillum binoferum* (IPI) was found to be superior over the earlier strains *Azospirillum* MDU 101 and MDU 204.

* Rice - rice - cotton and fodder grass + legume with goats in deep litter system gave high net return of Rs 24,360/ha (103% over the existing system) in Cauvery Delta Region.

* Rice varieties viz., CR 1009, ADT 38, IR 20 and CO 43 could be direct seeded during 33rd standard week (August, 13-19) where the dependability of rainfall was high (118%) ensuring ideal germination and establishment of semi-dry rice.

* *Azolla filiculoides* is suitable for acid and alkaline soil conditions compared to *A. pinnata*.

* A simple portable manual thrashing aid for rice has been developed at Aduthurai with a net cost of Rs. 175 per unit.

* Adoption of complete IPM resulted in maximum yield of rice (5187 kg/ha) when compared to farmer's method (4298 kg/ha).

* *Prosopis* and *Ipomea* leaf extracts at 10% concentration effectively controlled the sheath rot of rice.

* The biocontrol agent, *Platygaster oryzae* released at 10 days after transplanting effectively controlled rice gall midge.

* For rainfed sorghum + cowpea system, presowing incorporation of isoproturon 0.5 kg/ha gave good control of weeds with higher selectivity to both the crops.

* A combined spray of zinc sulphate (0.5%), copper sulphate (0.5%) and boric acid (0.2%) at stray flowering and 15 days later increased the grain yield by 17.4% in pearl millet.

- Soaking maize seeds in cycocel at 250 ppm for 16 hours increased the mean grain yield by 200 kg/ha.

- In redgram a population of 80,000 plants/ha adopting 50 x 25 cm spacing was found to be optimum.

- Seed treatment of blackgram with *Trichoderma* spp was found to significantly reduce the incidence of root rot disease.

- Spraying neem oil at 3.0% twice reduced the incidence of powdery mildew and yellow mosaic in blackgram.

- Scheduling irrigation at 0.6 IW/CPE ratio throughout the crop period resulted in highest yield in soybean during summer (1422 kg/ha) and Kharif season (1621 kg/ha).

- In chickpea three sprays of NPV @ 250 LE/ha along with 10% aqueous leaf extract of *Vitex negundo* effectively controlled the *Heliothis armigera* larvae.

- Foliar spray of triacontanol 3 ppm twice (30 and 45 DAS) along with basal application of triacontanol granule @ 10 kg/ha consistently increased the yield of groundnut.

- Application of quinalphos 1.5% D @ 25 kg/ha significantly controlled the leaf miner larvae in groundnut.

- Raising blackgram as an associate crop with sunflower registered higher LER (1.07) and monetary return (Rs. 8649/ha).

- Endosulfan 0.05% and phosalone 0.05% controlled the sunflower leaf hoppers effectively.

- The Erode Monthan banana was found to be a remunerative intercrop in coconut gardens.

- Application of neem cake (5 kg/tree) + *Trichoderma harzianum* (500 g inoculum in 50 kg of FYM) recorded lowest wilt disease index and high nut yield.

- Seed treatment with either Aldrin or Chlorpyriphos 50 ml/kg of seed was effective in the control of cotton surface weevil.

- Jute can be successfully grown in Coimbatore, South Arcot, Thiruvannamalai Sambuvarayar, Vellore Ambedkar, Chengai Anna and parts of Thanjavur, Trichy, Pudukottai, Nellai Kattabomman and Chidambaranar districts where assured supply of irrigation water is available.

* Blackgram and soybean can be grown profitably as inter-crop in sugarcane without affecting the sugarcane yield.

* A quick method has been developed at the Sugarcane Research Station, Cuddalore, to prepare reinforced compost from sugarcane trash and pressmud under aerobic conditions.

* Treating setts in a mixture of carbendazim 0.5 g, urea 10 g, malathion 2 ml and lime 10 g per litre of water was found to be superior in controlling the sett rot and enhancing germination.

* Carbendazim 0.1 per cent spray effectively controls sigatoka leaf spot disease and increases the bunch weight of banana.

* Foliar spray of 0.5% Zn SO_4 + 0.1% urea thrice at 20 days interval effectively controls interveinal chlorosis and little leaf of citrus.

* In grapes, application of 20g of phorate/vine after pruning controls root knot nematode.

* Ridomol 0.2% drenching @ 3.4 litres/tree twice at 15 days interval effectively checks root rot of papaya.

* Application of 60 : 60 : 30 kg NPK/ha recorded the highest yield of 14.4 t/ha in rainfed tomato.

* A combination of 150 : 30 : 30 kg NPK/ha with a spacing of 75 x 50 cm was found to be optimum for high yield in brinjal.

* Onion requires irrigation at 1.2 IW/CPE ratio and application of N at 90 kg/ha for getting high yield.

* Application of N @ 120 kg/ha as neem cake blended urea in two splits (March and August) was found to increase the yield of coffee when compared to 160 kg/ha of urea in 4 splits.

* Application of Zn SO_4 @ 25 kg/ha recorded an increased yield of 7.1 per cent in turmeric.

* The soft wood grafting technique for cashew has been standardised with 50.0 - 60.0 per cent success.

* Application of NPK @ 500 : 200 : 300 g/tree in an area of 1.5m width between 1.5m and 3.0m from the base of the trunk recorded the highest yield of 5.2 kg raw nuts/tree in cashew.

* Use of solar cooker as a supplementary energy saver resulted in a saving of 29% in the expenditure towards indane gas.

- *Acacia mellifera* and *Casuarina equisetifolia* were found to return the highest amount of nitrogen through litter fall.

Transfer of Technology

The Directorate of Extension Education in the university effectively and rapidly disseminated the research information developed at various centres to the farmers. A summary of the activities in this connection is presented below :

- The six Krishi Vigyan Kendras conducted on-campus and off - campus training programmes in agriculture and allied activities. In all 602 training programmes were conducted for the benefit of 10737 farmers, 6282 farm women, 3198 extension workers, 1946 youths and 357 other categories of personnel.

- The scientists of five Plant Clinic Centres diagnosed various crop maladies and suggested timely solutions. Farm advisory services numbering 1050 were organised besides conducting 100 trainings, 62 demonstrations, 120 group meetings, 3 field days and 4 farmers' days by the above clinics.

- The ICAR sponsored National Demonstration Scheme at Namakkal organised 18 training programmes, 14 skill demonstrations, 11 village/group meetings and 24 field days for providing the feasibility of achieving maximum output in rainfed crops.

- Under the lab-to-land programme of the ICAR 300 farm families were adopted by six TNGDNAU Centres. They were provided with technical guidance and input support on activities related to agriculture, horticulture, agricultural engineering, home science, sericulture and mushroom cultivation.

- The Communination Centre offered lessons through Farm School on All India Radio relating to integrated farming systems, women and agriculture, vegetable cultivation and soil fertility benefiting 950 registered farmers and thousands of other farmers indirectly.

- Eight correspondence courses on sericulture, new plant protection measures in farming, new method of paddy cultivation, cotton cultivation, banana, cultivation, forage crops, farm machineries and implements and flower cultivation for which 358 farmers had been enrolled and benefited.

- New audio cassette lesson on sathugudi cultivation was prepared and 113 recorded cassettes were sold.

- The video production unit produced 15 general programmes and 33 two minutes-Vayalum Valvum programmes which were telecast through Doordarshan Kendra, Madras.

- The training unit conducted 40 training programmes benefiting 816 extension personnels of state department of agriculture, administrators, defence personnel, NDDB extension personnel, scientists of TNGDNAU etc.

- Students' counselling and placement centre organised coaching classes for various competitive examinations, self employment training programmes for the farm graduates, campus interviews and information on employment opportunities.

- Timely and need based messages were processed and sent to the mass media and extension functionaries, through Agricultural Information Service Centres of the Tamil Nadu G. D. Naidu Agricultural University.

Focus for 1991 - 92

Education

- Starting M. Sc. and Ph. D. programmes in Sericulture.

- Startnig M.Sc. degree programme in Pomology, Olericulture, Floriculture and Spices and Plantation Crops.

- Starting post-graduate courses at College of Horticulture and Research Institute, Periyakulam.

- Introducing semester system of education in under-graduate and post-graduate programmes.

Research

- Breeding high yielding crop varieties for regional specificity with tolerance/resistance to biotic and abiotic stresses.

- Evolving genotypes for special situations like drought, salt affected soils, water logged situations etc.

- Intensification of research on hybrid rice including seed production technology.

- Use of bio-technology and genetic engineering for crop improvement.

- Emphasis on water management research including watershed management.

- Intensification of reseerch on dry farming and rainfed agriculture.

- Great emphasis on bio-fertilizer research.

- Developing pest and disease management techniques through bio-control agents.

- Identification of soil erosion, categorisation of problem soils, waste land etc. by employing remote sensing.
- Research on farming system approach.
- Efficient use of agricultural and industrial wastes.
- Post-harvest research in agricultural and horticultural crops.
- Strengthening of breeder seed programme.
- Emphasis on agro-forestry.
- Bio-energy and plasticulture.
- Design and development of new farm implements and tools.
- Identification of pollutants in specific situations inclusive of industrial pollutants and developing strategies to mitigate such problems.
- Intensification of training programmes to the field level staff, development officers and farmers.
- Preparation of video films on crop production technologies.
- Bringing out required publications with timely information for the benefit of farming community.

2. UNIVERSITY ADMINISTRATION

OFFICERS OF THE UNIVERSITY

Chancellor	:	Shri Surjit Singh Barnala His Excellency the Governor of Tamil Nadu
		Shri Bishma Narayan Singh His Excellency the Governor of Tamil Nadu
Pro-Chancellor	:	Thiru Veerapandi S. Arumugam Hon'ble Minister for Agriculture (upto 29.1.1991)
Vice-Chancellor	:	Dr. S. Jayaraj
Registrar	:	Dr. A. Narayanan (upto 14.3.1991)
		Dr. C. Ramaswami (From 15.3.1991)
Director of Research	:	Dr. S. Chelliah
Director of Extension Education	:	Dr. G. Perumal (From 29.10.1990)
Dean (Agri)	:	Dr. SP. Palaniappan (Upto 28.10.1990)
		Dr. G. Soundarapandian (From 29.10.1990)
Dean (Post-graduate Studies)	:	Dr. G. V. Kothandaraman (Upto 28.2.1991)
		Dr. M. Gopalan (From 1.3.1991)
Dean (Hort)	:	Dr. I. Irulappan (From 29.10.1990)

Dean (Engg.)	:	Prof. K. R. Swaminathan
Dean (Forestry)	:	Thiru G. Kumaravelu, I.F.S.
Dean, Agrl College and Research Institute, Madurai	:	Dr. T. S. Manickam (Upto 28.10.90)
		Dr. S. Sankaran (From 29.10.90)
Dean, Agrl. College and Research Institute, Killikulam	:	Dr. G. Soundarapandian (Upto 28.10.90)
		Dr. M. Rangarajan (From 31.10.90)
Dean, Anbil Dharmalingam Agrl. College, Kumulur	:	Dr. K. M. Ramanathan
Dean, College of Horticulture, Periyakulam	:	Dr. R. Arumugam (From 31.10.90)
Director School of Genetics	:	Dr. S. R. Sree Rangaswamy (Upto 29.10.90)
		Dr. A. Narayanan (From 8.3.91)
Director Soil & Crop Management Studies	:	Dr. S. Sankaran (Upto 28.10.90)
		Dr. SP. Palaniappan (From 29.10.90)
Director, Centre for Plant Protection Studies	:	Dr. P. Vidhyasekaran
Director, CARDS	:	Dr. A. Kandaswamy (Upto 28.10.90)
		Dr. V. S. Subramaniyan (From 29.10.90)
Director Water Technology Centre	:	Dr. P. Kandaswamy (upto 28.10 90)
		Dr. A. Rajagopal (from 29.10.90)

Director, Centre for Plant Molecular Biology and Bio-Technology, Coimbatore	:	Dr. S. R. Sree Rangaswami (from 7.11.90)
Director TRRI, Aduthurai	:	Dr. A. Abdul Kareem
Estate Officer	:	Er. D. Rajapathy (upto 31.8.90)
		Er. M. Rajagopalan (from 4.1.91)
Comptroller	:	Thiru V. Athmanathan (upto 31.10.90)
		Thiru S. T. Kuttalingam (from 12.12.90)

BOARD OF MANAGEMENT

Chairman Vice-Chancellor	:	Dr. S. Jayaraj
Secretary to Government Agriculture Department and Agricultural Production Commissioner	:	Tmt. Latika D. Padalkar, I.A.S.
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Member - Secretary	:	Dr. A. Narayanan Registrar (upto 14.3.91) Dr. C. Ramaswami Registrar (from 15.3.91)

Meetings of the Board of Management

During the year 1990-91, the Board of Management met five times on 18.4.90, 23.6.90, 9.8.90, 29.10.90 and 21.2.91.

The following were some of the important decisions taken by the Board of Management at these meetings.

Research

The Board approved the implementation of the following schemes :

1. Evaluation of productivity of oilseeds in Tamil Nadu.
2. Studies on the effect of alcohol distillary effluent on soil fertility status, yield and quality of crop produce.
3. Scheme for breeder seed production in groundnut, Vamban.
4. Evolving new varieties and technology for higher productivity in casuarina, Vridhachalam.
5. Tissue culture technique for forest trees, Mettupalayam.
6. Evaluation of scented and nonscented rices, Aduthurai.
7. Development of sorghum varieties for industrial purpose, Vellore.
8. Studies on the improvement and management of sweet oranges, Periyakulam.
9. Mitochondrial DNA and proteins in cytoplasmic male sterility in sorghum, Coimbatore.

10. Development of monoclonal antibodies for RTV in rice and CMV and BBTV in Banana, Coimbatore.

11. Technology development for waste land reclamation in coastal areas, Cuddalore.

12. Mass production and quality control of bio-fertiliser, Paiyur.

13. Studies on processing technology for soya based foods, Madurai.

14. Establishment of seed technology unit at Killikulam.

15. Resource inventry for Tamil Nadu using remote sensing technique, Coimbatore.

16. Studies on seed crop management practices under dryland conditions, Aruppukottai.

17. Bio-fertilizer research for forest system in Western Ghats, Kodaikanal.

18. Strengthening foliar diagnosis research to alleviate nutritional and physiological disorders in crop plants, Periyakulam.

19. Causes for button shedding, nut shrinking and ill filling in coconut, Veppankulam.

20. Studies on drought climatology, Trichy.

21. Operational research on pests and diseases management in rice, Kattuthottam.

22. Survey and management of pests of forests and forage trees, Mettupalayam.

23. Teaching science and technology to farm women through video cassette, Madurai.

24. Scheme for study on the optimisation of resource in the farming system.

25. ICAR Scheme for promotion of research and development efforts on hybrids in sunflower.

26. ICAR Scheme - Agro-techniques for maximising yield in chewing tobacco in western zone of Tamil Nadu.

27. ICAR Scheme on promotion of research and development efforts on hybrids in selected crops - pigean pea.

28. ICAR Scheme on development of *alloplasmic* cytosterile line in pearl millet.

29. ICAR Scheme on development of high yielding hybrids of rice.

30. GOI - Chemical constituents of neem and Karanj kernels.

31. ICAR Adhoc scheme - Methodology for early detection of Thanjavur Wilt of coconut.

32. ICAR Scheme on alternative model for T & V system.

33. GOI Scheme for the establishment of Centre for Plant Molecular Biology at Coimbatore.

34. Private agency scheme - social forestry education through awareness campaigns, video teaching and direct training to farm women and youth.

35. Private agency scheme - Seed fortification and mid-storage treatment for prolonging shelf life of crops.

36. Indo-Sarec Project on stand alone fuel cell power plants for rural electrification in India.

37. ICAR - New Research Scheme - *In vitro* culture studies for improvement of banana clones, Horticulture Research Station, Periyakulam.

38. ICAR - Research Scheme on exploitation of symbiotic nitrgen fixation of actinorrhizal plants for afforestation and soil rehabilitation, Dept. of Agri, cultural Microbiology, Coimbatore.

39. ICAR - First Line Demonstration on oilseed crops during Rabi 1990-91- Coimbatore, Trichy, Madurai, Vridhachalam and Kattupakkam.

40. Government of India Central Sector Scheme for integrated programme for the development of spices. Scheme for production of foundation seed of chillies and minor spices - Coimbatore and Bhavanisagar.

41. DBT Scheme on the technology development and demonstration project on bio-fertilizers, Blue Green Algae - Department of Agricultural Microbiology, Soil and Crop Management Studies, Coimbatore.

42. Private agencies - Central Silk Board - Investigation on the quantitative and qualitative increase in the yield of leaves of mulberry through micorrhizal inoculation, Regional Regional Research Station, Paiyur.

43. Private agencies - Collaborative research project on tapioca sponsored by M/s Hidustan Lever Ltd., Vegetable Research Station, Palur, South Arcot.

44. Private agencies - Central Silk Board, Bangalore - Studies on foliar application of micro nutrients to mulberry and its effect on economic characters of silkworm *Bombax mori*, Department of Sericulture, Coimbatore.

45. Private agencies - Central Silk Board - Developing *Azospirillum* and *Azotobacter* bio-fertilizers for mulberry, Regional Research Station, Paiyur.

46. Central Silk Board - Ministry of Textiles, Government of India - Research proposals on investigation on polyhedrosis virus diseases in *Bombyx mori* and their management, Centre for Plant Protection Studies, Coimbatore.

47. DPAP Scheme - Production and distribution of vegetative hedge, fodder crops and fruit seedlings and providing training in Kamarajar District, Regional Research Station, Aruppukottai.

48 Government of India Scheme - Central Sector Scheme - Production of fruits and vegetables, College of Horticulture, Periyakulam and Coimbatore, Vegetable Research Station, Palur.

49. Spices Board - Scheme for spices develoment in selected states, Comibatore.

50. Government of India Scheme - Ministry of Science and Technology, Department of Bio-technology - Project for selection and cloning of hyper lignine-lytic *Streptomyces* sp. for conversion of lignin rich waste (coir dust) to energy chemicals and humus like polycondensates, Coimbatore.

Education

1. Approved the institution of the following endowments at Rs. 10,000/- each as follows :

   a. Chancellor Surjit Singh Barnala Prize for the best student in M.Sc. (Environmental Sciences).

   b. Chief Guest Dr. Kalaignar M. Karunanithi Prize for the best student in M.Sc. (Food Science and Nutrition).

   c. Special Guest Dr. S. Krishnamoorthy Prize for the best student in M.Sc. (Forestry).

   d. Special Guest Dr. M. Ramachandran Prize for the best student in M.E. (Agri) in Bio-energy.

2. Approved the adoption of G. O. Ms. No. 81, B & MBC Welfare Department dt. 26.4.90 for extending free education to students hailing from Most Backward Community and denotified community for the academic yea 1990-91.

3. Approved the implementation of reservation of one seat to the children of defence personnel over and above the admission strength from the academic year 1990-91.

4. Approved the starting of Ph.D. programmes in the disciplines of Forestry, Bio-technology, Plant Nematology and Environmental Sciences (5 seat in each discipline).

5. Approved the creation of a separate Directorate of Centre for Plant Molecular Biology with the following departments :

   a) Department of Plant Molecular Biology
   b) Dept. of Bio-technology
   c) Department of Bio-chemistry

Administration

1. Approved the renewed agreement between the university and the Government of Pondicherry in respect of Krishi Vigyan Kendra, Pondicherry for a further period of 5 years upto 23.7.1994.

2. Approved the amendment to Statutes 7 (1) (a) for the payment of salary to Vice-Chancellor as fixed by the government from time to time and DA and other allowances as applicable to the Vice-Chancellors governed by UGC scale of pay in force.

3. Approved the adoption of G. O. Ms. No. 67, P & AR Department dated 8.2.90 regarding 5 day a week in the university with effect from 12.2.1990.

4. The College of Forestry and the College of Horticulture functioning at Coimbatore have been ordered by the government for shifting to Mettupayam and Periyakulam respectively.

Budget and Accounts

1. Approved the revised estimates for 1989-90.

2. Approved the audit report for 1987-88 and annual accounts for 1987-88.

3. Approved the budget estimate for 1990-91.

4. Approved the implementation of G.O. Ms. No. 1275 Finance (Ways and Means) Department dated 4.12.90 for investing provident fund accumulations in publica ccounts with government.

5. Approved the revised estimates for 1990-91 and annual report and audit report 1988-89.

Education

1. The following new post-graduate programmes were started in the university :

   i. Post-graduate programme leading to Ph.D. (Forestry)
   ii. Post-graduate programme leading to Ph.D. (Environmental Science)
   iii. Post-graduate programme leading to Ph.D. (Bio-technology)

2. M.Sc. (Ag) programme was started at Agricultural College & Research Institute, Killikulam in six disciplines, namely, Agronomy, Plant Breeding and Genetics, Soil Science and Agrl. Chemistry, Agrl. Entomology, Agrl. Economics and Agrl. Extension during the academic year1990-91.

3. The academic activities and infrastructural facilities at the fourth Agricultural College at Kumulur, Lalgudi for second phase have been strengthened.

Academic Council

Chairman

Vice-Chancellor	:	Dr. S. Jayaraj

Members

Secretary to Government, Agriculture Department & Agrl. Production Commissioner	:	Tmt. Latika D. Padalkar, I.A.S.
Dean, Agrl. College & Research Institute, Coimbatore	:	Dr. G. Soundrapandian
Dean, Post-graduate Studies, Coimbatore	:	Dr. M. Gopalan
Dean, College of Horticulture, Coimbatore	:	Dr. I. Irulappan
Dean, College of Agrl. Engineering, Coimbatore	:	Prof. K. R. Swaminathan
Dean, Agrl. College & Research Institute, Madurai	:	Dr S. Sankaran
Dean, Agrl. College & Research Institute, Killikulam	:	Dr. M. Rangarajan
Director of Research, Coimbatore	:	Dr. S. Chelliah

Director of Extension Education, Coimbatore	:	Dr. G. Perumal
Director, School of Genetics, Coimbatore	:	Dr. A. Narayanan
Director, Centre for Agrl. and Rural Development Studies, Coimbatore	:	Dr. V. S. Subramaniyan
Director, Centre for Plant Protection Studies, Coimbatore	:	Dr. P. Vidyasekaran
Director, Water Technology Centre, Coimbatore	:	Dr. A. Rajagopal
Director, Centre for Soil and Crop Management Studies, Coimbatore	:	Dr. SP. Palaniappan
Director, Centre for Plant Molecular Biology and Bio-technology	:	Dr. S. R. Sree Rangaswamy
Director, Tamil Nadu Rice Research Institute, Aduthurai	:	Dr. A. Abdul Kareem
Six Members among the Heads of Departments nominated by Vice-Chancellor	:	1. Thiru R. Karunanidhi Professor and Head Dept of Farm Machinery College of Agrl. Engg., Coimbatore 2. Dr. K. Mayalagu Professor and Head Dept. of Soil Science & Agrl. Chemis Agrl. College & Research Instt., Madurai 3. Dr (Tmt.) Sukanya Subramaniam Professor and Head Dept. of Agrl. Botany Agrl College & Res. Instt., Madurai 4 Dr. A. Mohammed Ali Professor and Head Dept. of Agronomy & Soil Science & Agrl. Chemistry Agrl College & Res. Instt., Killikulam

		5. Dr JBM. Md Abdul Khader Professor and Head Dept of Floriculture and Plantation Crops College of Horticulture Coimbatore
		6. Dr T V. Karivaratharaju Professor and Head Dept of Seed Technology Centre for soil & Crop Management Studies Coimbatore
Three members having special knowledge or practical experience in different aspects of agriculture, nominated by Vice-Chancellor	:	1. Dr. A. Alam Asst. Director General (Agrl. Engg.) ICAR, Krishi Bhavan New Delhi
		2. Dr. R. Yamdagni Professor of Horticulture Haryana Agrl. University Hissar
		3. Dr. C. Sreedharan Dean, College of Agriculture Kerala Agrl. Uhiversity Vellayani Trivandrum
Member Secretary	:	Dr. A. Narayanan (upto 14.3.91) Dr. C. Ramaswami (from 15.3.91)

Meetings of the Academic Council

The Academic Council met three times during the period under report. The following important decisions were taken.

1. Accepted the reduction of admission strength in degree programmes and certain changes in the Masters Degree Programmes in the Tamil Nadu G. D. Naidu Agrl. University.
2. Accepted the proposal for the admission into under-graduate programmes the heirs of the employees of Tamil Nadu G. D. Naidu Agricultural University, who die in harnees or retire on medical invalidation.

3. Accepted to reserve one seat to the children of defence personnel from the academic year 1990-91.

4. Accepted the proposal for the extension of free education to the students hailing from Most Backward Community / Denotifed Community from the academic year 1990-91.

5. Accepted the government order providing weightage in marks in respect of students hailing from non-graduate families.

6. Accepted the proposal for implementation of University New Plan Schemes as recommended by the Plan Scheme Committee in Tamil Nadu G. D. Naidu Agrl. University during the year 1990-91.

7. Accepted the creation of a separate Directorate of Centre for Plant Molecular Biology and Bio-technology.

8. Approved the inclusion of self-employment oriented courses in the III & IV year courses.

9. Accepted the proposal of admitting 25 Assistant Agrl. Officers into B.Sc.(Ag.) course during 1990-91 deputed from the Agriculture Department.

10. Accepted the proposal of giving exemption from the reservation policy for the technical posts sanctioned in the Department of Plant Molecular Biology and Bio-technology in the School of Genetics, Tamil Nadu G. D. Naidu Agricultural University, Coimbatore.

11. Accepted the guidelines for selection of candidates under "Career Advancement Programme" issued by the UGC.

12. Accepted the award of merit scholarships to the under-graduate and post-graduate students of Agrl. College and Research Institute, Coimbatore from the accumulated interest amount.

13. Accepted to rename the Tamil Nadu Agricultural University as Tamil Nadu G. D. Naidu Agricultural University.

14. Accepted the shifting of I year B. Sc. (Forestry) degree programme from Coimbatore to Forestry Research Station, Mettupalayam.

15. Accepted the shifting of I year B. Sc. (Horticulture) from Coimbatore to Horticultural Research Station, Periyakulam.

16. Accepted the admission of Sri Lankan Refugees students into B.Sc. (Ag.) degree programme during the year 1990-91.

17. Accepted in principle to switch over to semester system from the trimester system.

Board of Studies

The Board of Studies in Forestry and Post-graduate Education constituted during the year 1989 was continued during the period under report. The Board of Studies in Faculty of Agriculture, Agricultural Engineering and Horticulture was reconstituted during the year 1991. Each Board of Studies was constituted with the following members.

1. Dean of the faculty.
2. Other Deans within the faculty.
3. Heads of Departments of concerned faculty.
4. All the Professors of the faculty.
5. Two elected representatives from among the Associate Professors and four from among the Assistant Professors.
6. Two experts in the concerned subjects from outside the university nominated by Vice-Chancellor.

Post-graduate studies

Dean (Post-graduate Studies)	:	Chairman
Registrar, Deans and Directors in all faculties	:	Members

One Professor representing from each faculty of Agriculture, Horticulture and Agrl. Engineering

i.	Dr. M. Stephen Durairaj Professor of Agrl. Botany School of Genetics, Coimbatore	:	Faculty of Agriculture
ii.	Dr. R. Arumugam Professor of Horticulture Dept. of Pomology Faculty of Horticulture, Coimbatore (upto 30.10.90)	:	Faculty of Horticulture
	Dr. N. Ramaswamy Professor of Horticulture College of Horticulture, Coimbatore (from 31.10.90)	:	Faculty of Horticulture

iii. Prof. R. Manian : Faculty of Agrl. Engineering
Professor and Head
Zonal Research Centre
College of Agrl. Engineering
Coimbatore

Two outside experts nominated by Vice-Chancellor

1. Dr. A. Narayanan,
Professor and Head
Dept. of Plant Physiology
Agricultural College
Bapatla-522 101

2. Dr. A. Rama Mohana Rao
Dean (Post-Graduate Studies)
Andhra Pradesh Agrl. University
Rajendra Nagar
Hyderabad-500 030

The Board of Studies for post-graduate education met twice during the year under report and recommended the following to the Academic Council :

1. Starting Ph.D. Programme in Forestry.
2. Starting Ph.D. Programme in Bio-technology.
3. Starting Ph.D. Programme in Environmental Sciences.
4. Starting M.Sc. in Forestry and Bio-Technology.
5. Accepted the eligibility of M.Sc. Home Science and Extension inservice candidates for admission to Ph.D. in Agricultural Extension.
6. Rivival of M.Sc. (Ag) in Agricultural Microbiology at Agricultural College & Research Institute, Madurai.
7. Starting M.Sc. (Ag.) in Crop Physiology at Agricultural College and Res. Institute, Madurai.
8. Accepted the eligibility to farm graduates for admission to Master of Business Management.

Faculty of Agriculture

Associate Professors

1. Thiru C. F. Vijayaragavan
Associate Professor
Department of Agronomy
Agrl. College & Res. Institute
Coimbatore

2. Dr. N. Nadarajan
Associate Professor
Dept. of Agrl. Botany
Agrl. College & Res. Institute
Madurai

Assistant Professors

1. Thiru P. Nasurudeen
Assistant Professor
Dept. of Agrl. Economics
Anbil Dharmalingam Agrl. College
Kumulur

2. Thiru M. Subash Chandra Bose
Assistant Professor
Dept. of Forage Crops
TNGDNAU, Madurai

3. Thiru C. R. Anandakumar
Assistant Professor
Dept. of Agrl. Botany
Agri. College and Res. Institute
Madurai

4. Thiru A. Balraj
Assistant Professor of Physics
Dept. of Agrl. Engineering
Agrl. College and Res. Institute
Killikulam

Nominated Members

1. Dr. V. Gopinathan Nair
Professor and Head
Dept. of Plant Breeding and Genetics
College of Agriculture
Vellayani, Trivandrum

2. Dr. M. Santharam
Professor and Head
Dept. of Soil Science and Agrl. Chemistry
Andhra Pradesh Agrl. University
Rajendranagar, Hyderabad-500 030

The Board of Studies (Agri) met once during the year under report and recommended the following to Academic Council :

1. Decided to introduce common question paper for final examination for the current year batch of students admitted in 1990-91.

2. Decided to conduct coaching classes and model examinations for the I B.Sc. (Ag) students.

Faculty of Forestry

Associate Professors

1. Dr. R. Jambulingam
Associate Professor
Forestry Research Station
Mettupalayam

2. Dr. R. Stephen V. Rai
Associate Professor
Forestry Research Station
Mettupalayam

Assistant Professors

1. Thiru K. K. Suresh
   Assistant Professor
   Forestry Research Station
   Mettupalayam

2. Thiru K. Sivagnanam
   Assistant Professor
   Forestry Research Station
   Mettupalayam

Nominated Members

1. Dr. S. Chinnamani
   Assistant Director General (Agro Forestry)
   Indian Council of Agricultural Research
   Krishi Bhavan
   New Delhi-110 001

2. Dr. T. C. Ramakrishna
   Deputy Conservator of Forests (Retired)
   90, Tatabad, Street No. 11
   Coimbatore-641 012

The Board of Studies (Forestry) met once during the year under report and recommended the following to the Academic Council :

1. Starting Ph.D. programme in Forestry.
2. Starting M Sc. in Forestry Bio-technology.
3. Guest lectures to post-graduate students in Forestry.
4. Shifting of College of Forestry from Coimbatore to Forestry Research Station, Mettupalayam.
5. Introduction of self employment oriented courses.

Faculty of Horticulture

Associate Professors

1. Thiru S. Balasubramanian
   Associate Professor (Hort)
   Anbil Dharmalingam Agrl. College
   Kumulur

2. Thiru V. Ponnuswamy
   Associate Professor (Hort)
   Horticultural Research Station
   Periyakulam

Assistcnt Professors

1. Tmt. D. Sarala Devi
   Assistant Prosessor (Hort)
   Horticultural Research Station
   Periyakulam

2. Thiru M. Selvarajan
   Assistant Professor (Hort)
   Sugarcane Research Station
   Sirugamani

3. Thiru L. Puhazhendhi
Assistant Professor (Hort)
Horticultural Research Station
Yercaud

4. Thiru M. Kannan
Assistant Professor (Hort)
College of Horticulture
Coimbatore

Nominated Members

1. Dr. M. N. Khan
Professor and Head
Division of Horticulture
University of Agrl. Sciences
GKVK Campus
Bangalore - 560 065

2. Dr. V. Suryanarayana
Professor and Head
Dept. of Horticulture
S. V. Agrl. College
Tirupathi - 517 503

The Board of Studies (Hort) met once during the year under report and recommended the following to the Academic Council :

1. Approval of draft syllabus for introduction of a new post-graduate course in Horticurture HORT. 822 Micro-Propagation of Horticultural and Plantation Crops 2+1 to Ph. D. in Bio-Technology.

2. Shifting B.Sc. (Hort) under-graduate programme from Coimbatore to Horticultural Research Station, Periyakulam.

3. Introduction of self employment oriented courses.

Faculty of Agrl. Engineering

Associate Professors

1. Thiru V. Murugesan
Assoc. Professor
Department of Bio-energy
College of Agricultural Engineering
Coimbatore

2 Thiru M. Koteeswaran
Associate Professor
Soil and Water Conservation
College of Agricultural Engineering
Coimbatore

Assistant Professors

1. Thiru D. Palanisamy
Assistant Professor
Soil and Water Conservation
College of Agricultural Engineering
Coimbatore

2. Thiru I. Seegan Paul
Assistant Professor
Department of Bio-energy
College of Agricultural Engineering
Coimbatore

3. Thiru D. Manohar Jesudas
Assistant Professor
Department of Farm Machinery
College of Agricultural Engineering
Coimbatore

4. Thiru K. Kathirvel
Assistant Professor
Department of Farm Machinery
College of Agricultural Engineering
Coimbatore

Nominated Members

1. Dr. C. P. Singh
College of Agricultural Engineering
Punjab Agricultural University
Ludhiana

2. Dr. Nawab Ali
ICAR Scientist
Central Institute of Agricultural
Engineering, Bhopal

Recognition Committee

The recognition committee met twice during the year under report and recommended the following to the Academic Council :

1. Considered the recognition of the M. Sc. Ag.) in Soil Science and Agricultural Chemistry degree of C. S. Azad University of Agriculture and Technology, Kanpur as equivalent to M. Sc. (Ag.) of Tamil Nadu G. D. Naidu Agricultural University for admission to Ph.D. programme.

2. Considered the recognition of B. Tech. (Agrl. Engineering) degree of the Kerala Agricultural University for admission to M. E. (Ag.) in Tamil Nadu G.D. Naidu Agricultural University.

3. Considered the recognition of M. Sc. (Ag) degree in Agricultural Economics of the Minia University, Egypt as equivalent in M.Sc. (Ag.) of Tamil Nadu G. D. Naidu Agricultural University for admission to Ph.D. programme.

4. Considered the B.Sc. Ag.) degree awarded by the University of Agriculture I, Vietnam and University of Agriculture No. IV, Vietnam for the purpose of admission to M. Sc. (Ag) programme of Tamil Nadu G. D. Naidu Agricultural University.

5. Considered the recognition of B.Sc. (Ag.) degree of the Somali National University, Somali Democratic Republic (Somalia) for the purpose of admission to M. Sc. (Ag.) programme of Tamil Nadu G. D. Naidu Agrl. University.

Courses and Curricula

Trimester system of education was followed for the under-graduate and post-graduate degree programmes and Ph. D. programme of all disciplines in the university.

A total number of 10, 327 application forms for the degree courses in Agriculture, Horticulture, Forestry, Agricultural Engineering and 28 applications for B.Sc. (Home Science) were received.

With regard to post-graduate programme, 709 applications for masters degree programme, 26 applications for post-graduate diploma course and 445 applications for doctoral degree programme were received. Selections for the post-graduate programmes were made after interviewing the candidates by the different selection committees appointed by Vice-Chancellor.

Under-graduate programme

During the year under report, number of students passed out and admitted in the different under-graduate degree programmes are furnished below :

Name of the degree programme	No. of students admitted	No. of students passed out
B.Sc. (Ag.)	413	322
B.Sc. (Hort)	55	55
B.E. (Ag)	114	24
B. Sc. (Home Science)	14	15
B.Sc. (Forestry)	22	17
Total	618	433

Post-graduate programme

Following are the number of post-graduate students passed out and admitted during the year under report :

Name of the degree programme	No. of students admitted	No. of students passed out
Masters' degree programme		
M.Sc. (Ag)	177	148
M.Sc. (Hort)	15	12
M.E. (Ag)	—	4
M.Sc. (Food Science)	4	2
M.Sc. (Bio-technology)	12	7
M.Sc. (Environmental Science)	5	--
M.Sc. (Forestry)	5	--
M.B.M.	8	8
Total	226	181

Post-graduate diploma in sericulture	10	4
Ph.D. degree programme		
Ph.D. (Agriculture)	85	66
Ph.D. (Horticulture)	6	2
Ph.D. (Agrl. Engineering)	8	--
Ph.D. (Food Science & Nutrition)	1	—
Ph.D. (Environmental Science)	4	—
Ph.D. (Forestry)	4	—
Ph.D. (Bio-technology)	5	—
Total	113	68

CONVOCATION

The fifteenth convocation of Tamil Nadu G. D. Naidu Agricultural University was conducted on June 24, 1990. The convocation was presided over by the Chancellor, His Excellency Shri Surjit Singh Barnala. The Chief Minister of Tamil Nadu, Dr. Kalaignar M. Karunanidhi, delivered the convocation address. Dr. S. Krishnamurthi formerly the Dean and Additional Director of Agriculture and Dr. S. Ramachandran, Secretary, Department of Bio-technology, Government of India were awarded the Honorary Degree of Doctor of Science at the convocation. A total number of 903 degrees and 78 prizes and medals were awarded to the graduates of the different degree programme both under-graduate and post-graduate.

Seminars / Symposia / Conferences

* Seminar on cashew at Regional Research Station, Vridhachalam. May 3, 1990.
* Seminar on modern practices in coffee at Horticultural Research Station, Thadiyankudisai. May 16, 1990.
* Seminar on rice cultivation at Rice Research Station, Ambasamudram. June 4, 1990.
* Scientific Workers' Conference (Horticulture) at Periyakulam. July 16-17, 1990.
* Workshop cum seminar on water conservation techniques for arid regions at Coimbatore. September 5-18, 1990.
* Workshop on strategies for command area development and farmers participation in water management at Coimbatore. November 5-18, 1990.

* State level seminar on dry farming at Regional Research Station, Paiyur. December 17-21, 1990.

* Under-graduate and post-graduate Teaching Seminars at Coimbatore. January 9-10, 1991.

* Seminar on betelvine cultivation at Sugarcane Breeding Institute, Sirugamani. January 19, 1991,

* Seminar on mango cultivation at Regional Research Station. Paiyur. February 20, 1991.

Trainings / Farmers' Days

* State Level Training programme on quality seed production in rice at Coimbatore. May 21-24, 1990.

* Farmers' Day at Cotton Research Station, Srivilliputhur. July 4, 1990.

* Training on fish culture at Tamil Nadu Rice Res. Institute, Aduthurai. September 12, 1990.

* Training on horticultural and plantation crops at Horticultural Res. Station, Thadiyankudisai. September 26, 1990.

* Farmers' Day at Regional Research Station, Vridhachalam. October 10, 1990.

* Training on nursery technology at Horticultural Research Station, Periyakulam. October 19, 1990.

* Training on integrated pest management on groundnut at Regional Research Station, Vridhachalam. October 31, 1990.

* Training on control of cotton bollworm at Agricultural Research Station, Vellore. November, 5 1990.

* Training on mushroom cultivation at Regional Research Station, Paiyur. December 7, 1990.

* Training on coffee production technology at Horticultural Research Station, Thadiyankudisai. January 1-18, 1991.

* Farmers' Day at Tamil Nadu Rice Res. Institute, Aduthurai. January 5, 1991.

* Farmers' Day at Agrl. College & Research Institute, Madurai. January 17, 1991.

* Training on water management at Coimbatore. January 8-10, 1991.
* Farmers' Day at Tamil Nadu G. D. Naidu Agricultural University, Coimbatore. January 11, 1991.
* Farmers' Day at Rice Research Station, Ambasamudram. January 31, 1991.
* Farmers' Day at Agrl. College and Research Institute, Killikulam. January 31, 1991.
* Farmers' Day at Regional Research Station, Paiyur. February 7, 1991.
* Farmers' Day at Agricultural Research Station, Aliyarnagar. February 7, 1991.
* Farmers' Day at National Pulses Research Centre, Vamban. February 14, 1991.
* Training on water management in irrigated condition at Coimbatore. Febuary 18-22, 1991.
* Farmers' Day at Krishi Vigyan Kendra, Trichy. February 19, 1991.
* Training on "Seed Farm Management, Seed Act and Rules" at Agricultural Research Station, Bhavanisagar. March 8, 1991.
* Farmers' Day at Agricultural Research Station, Bhavanisagar. March 8, 1991.
* Training on vegetable seed production, processing and storage technology at Coimbatore. March 11-13, 1991.
* Farmers' Day at Rice Research Station, Tirur. March 16, 1991.
* Farmers' Day at Oilseeds Research Station, Tindivanam. March 17, 1991.
* Farmers' Day at Agricultural Research Station, Paramakudi. March 22, 1991

Important events Visitors

* Dr. Michio Nozaki, ADECA Mission, Japan visited Agrl. Res. Station, Bhavanisagar on April 19, 1990.
* Dr. Jai S. Gawandar, Senior Scientific Officer, Sugarcane Research Centre, FIJI Sugar Corporation Ltd., LAUTONA, FIJI visited Sugarcane Research Station, Cuddalore on April 24, 1990.
* Dr. I. P. Abrol, Deputy Director General, ICAR visited Tamil Nadu G. D. Naidu Agrl. University, Coimbatore on May 4, 1990.

* Hon'ble Minister for Social Welfare, Government of Tamil Nadu, Tmt. Subbulakshmi Jagadeesan visited Horticultural Research Station, Yercaud on May 19, 1990.

* Hon'ble Minister for Agriculture, Government of Tamil Nadu, Veerapandi Thiru S. Arumugam visited Horticultural Research Station, Yercaud on May 20, 1990.

* Hon'ble Minister for Agriculture, Government of Tamil Nadu Veerapandi Thiru S. Arumugam visited Agricultural Research Station, Bhavanisagar on June 6, 1990.

* Thiru K. Nadarajah, Chairman, Sri Lanka ; Prof. S. Kandian, Head, Department of Agronomy, University of Jaffna, Sri Lanka visited the Palmyrah Research Centre, Srivilliputhur on June 19, 1990.

* His Excellency S. S. Barnala, Chancellor and Governor of Tamil Nadu visited, Tamil Nadu G. D. Naidu Agrl. University, Coimbatore on June 23, 1990.

* Hon'ble Chief Minister of Tamil Nadu, Dr. Kalaignar M. Karunanithi, Hon'ble Union Minister for Housing and Urban Development Thiru Murasoli Maran, Hon'ble Ministers of Government of Tamil Nadu, Thiru Ko. Si. Mani, Thiru K. N. Nehru, Thiru S. Thangavelu, Thiru Pon Muthuramalingam, Thiru Chandrasekaran and Thiru Ponmudi visited, Anbil Dharmalingam Agrl. College, Kumulur on July 7, 1990.

* Dr. Blum, Entomologist, University of Georgia, USA visited Horticultural Research Station, Udhagamandalam on August 2, 1990.

* "Neem day" was celebrated at Agricultural Research Station, Paramakudi on August 9, 1990,

* Dr. Penning de Verie, IRRI, Manila, Philippines visited TRRI, Aduthurai on October 5, 1990.

* Dr. M. V. Rao, Member, World Bank, visited Regional Research Station, Vridhachalam on October 17, 1990.

* Dr. Beadon, Potash Research Institute, Canada visited Agricultural Research Station, Aliyarnagar on November 4, 1990.

* "Woman in Agriculture" day was conducted at Tamil Nadu G. D. Naidu Agrl. University, Coimbatore on December 3, 1990.

* Dr. Jens Kallatinski, Institute of Tropical Agriculture, University of Leipzig, Germany visited Horticultural Res. Station, Yercaud on December 11, 1990.

- Dr. J. Lin Compton, Professor of Extension, University of Wisconsin visited the Water Technology Centre, Coimbatore on December 15, 1990.

- His Excellency S. S. Barnala, Chancellor and Governor of Tamil Nadu and Hon'ble Minister for Rural Development and Administration, Goverment of Tamil Nadu Thiru Ko. Si. Mani visited Tamil Nadu Rice Research Institute, Aduthurai on December 31, 1990.

- Dr. E. G. Silas, Vice-Chancellor, Kerala Agrl. University visited Plant Clinic Centre, Tirur on February 13, 1991.

- Dr. J. Lin Compton, Professor, University of Wisconsin, USA, visited Department of Agrl. Extension and Rural Sociology, Agrl. College and Research Institute, Coimbatore on March 7, 1991.

- Dr. S. K. De Datta, and Dr. keith T. Ingram, Agronomists, IRRI, Manila, Philippines visited Rice Research Station, Tirur on March 12, 1991.

- Dr. John Bennet, Senior Scientist, ICGES, New Delhi visited Rice Research Station, Tirur on March 16, 1991.

FOREIGN VISITS

List of scientists deputed abroad to participate in the Training/Workshop/Symposium/Seminar etc. during 1990-1991.

Sl. No.	Name and Designation of Scientists	Country visited	Period	Purpose
1.	Dr. Tmt. Raniperumal Pofessor (SS & AC), Coimbatore	F. A. O., Rome Italy	2.4.90 to 6.4.90	To attend fertilizer week
2.	Dr. S. Krishnamoorthy Professor (Agrl. Econ), Coimbatore	U. S. A.	3.4.90 to 3.7.90	To undergo post-doctoral programme under Ford Foundation grant
3.	Dr. M. Raveendran Associate Professor (Econ) AC & RI, Madurai	U. K.	Three months from 6.4.90	-do-
4.	Thiru S. V. Kottiswaran Assistant Professor, Dept. of Soil & Water Conservation, CAE, Coimbatore	Sweeden	17.4.90 to 8.6.90	Training programme in Water Resources Development and Management in Arid and Semi Arid Regions
5.	Dr. S. R. Sree Rangasamy Director, School of Genetics Coimbatore	IRRI, Manila	9.5.90 and 10.5.90	International Programme on Rice Bio-Technology
6.	Dr. S. Chelliah Director of Research, Coimbatore	IRRI, Manila	14.5.90 to 18.5.90	Second International Rice Genetic Symposium
7.	Dr. K. Palaniswami Associate Professor (Econ), Water Technology Centre, Coimbatore	IFPRI, Washington	4.6.90 to 8.6.90	IFPRI Project Meeting of Modelling in Irrigation Investment in Tamil Nadu

8.	Thiru S. Kamaraj Associate Professor, Dept.of Bio-Energy, College of Agrl. Engg., Coimbatore	Syria	From 12.6.90 for 50 days	Setting up facilities for production of bio-energy
9.	Thiru P. Subramanian Assistant Professor (Micro), Tamil Nadu Rice Research Instt., Aduthurai	China	14.6.90 to 1.7.90	International Azolla Training Course
10.	Dr. S. Kannaiyan Professor of Bio-Technology, Coimbatore	-do-	14.6.90 to 1.7.90	-do-
11.	Thiru R. Vijayaraghavan Assistant Professor (Micro), Dept. of Plant Molecular Biology & Bio Technology, Coimbatore	West Germany	20.6.90 to 26.6.90	Training Programme on Electro Cell Fusion
12.	Thiru S. Mohan Associate Professor (Pl. Path) University Research Centre, Vellore	Bangkok, Thailand	2.7.90 to 27.7.90	Group Training Course on Plant Protection Service
13.	Thiru A. Ramaraju Assistant Professor (Agrl. Ento) Anbil Dharmalingam Agrl. College, Kumulur	-do-	-do-	-do-
14.	Thiru M. Shivanantham Associate Professor (Ag. Econ) Krishi Vigyan Kendra, Vridhachalam	IRRI, Manila Philippines	17.7.90 to 16.11.90	Training Programme on Farming systems
15.	Dr. G. Perumal Professor & Head Dept. of Agrl. Extension and Rural Sociology, Coimbatore	Mississippi U.S.A.	26.6.90 to 5.10.90	Post-doctoral Training Programme at University of Florida, U.S.A.

16.	Dr. R. Manickam Professor & Head, Dept. of Animal Husbandry, Coimbatore	Tokyo, Japan	24.7.90 to 6.8.90	Seminar on Farm Level Animal Feeding Systems, Japan
17.	Thiru S. Santhana Bosu Associate Professor (Agrl. Engg.) Water Technology Centre, Coimbatore	IFPRI, Washington	30.7.90 to 2.9.90	Preparation of project report of IFPRI Scheme on Major Irrigation Systems.
18.	Dr. SP. Palaniappan Dean, Agrl. College and Res. Institute, Coimbatore	Koyato, Japan	12.8.90 to 31.8.90	14th International Congress of Soil Science Symposium on maximum yield research
19.	Dr. C. Ramasamy Professor of Agrl. Econ. Coimbatore	IRRI, Manila Philippines	15.8.90 to 31.8.90	To finalise project work on Differential Impact of Modern Rice Technology
20.	Dr. K. Palanisami Associate Professor (Agrl. Econ) Water Technology Centre, Coimbatore	University of Minnesota U.S.A.	1.9.90 to 30.11.90	Award of Senior Post-Doctoral Fullbright Fellowship
21.	Dr. A. Kandaswamy Director (CARDS) Coimbatore	IFPRI, Washington U.S.A.	15.9.90 to 7.10.90	IFPRI Collaborative Research Projects Review work for data analysis and report writing.
22.	Dr. C. Ramaswamy Professor of Agrl. Econ., Coimbatore	-do	15.9.90 to 31.10.90	-do-
23.	Dr. SP. Palaniappan Dean (Agri), Coimbatore	IRRI, Manila Philippines	11.9.90 to 13.9.90	INSURF - Subnetwork - Co - ordinate Meeting held at IRRI, Manila
24.	Dr. S. Kannaiyan Professor of Bio-Technology, Coimbatore	-do-	-do-	-do-

25.	Dr. G. Arjunan Associate Professor (Plant Path) National Pulses Res. Centre, Vamban	AVRDC, Thaiwan, China	1.10.90 to 28.10.90	To attend vegetable viruses training workshop at Thaiwan
26.	Dr. R. Annamalai Professor, Agrl. Extension, Agrl College & Res. Institute, Madurai	University of Wisconsin, U. S. A.	3 months from 28.8.90	Post-Doctoral Fellowship Training under Ford Foundation grant
27.	Dr. R. Stephen V. Rai Associate Professor, Forestry Res. Station, Mettupalayam	University of Padora, Italy.	26.9.90 to 29.9.90	International Symposium on Agro ecology and Conservation-issues in temperate and tropical regions, Italy
28.	Dr. A. Manickam Associate Professor (Bio Chem) Dept. of Bio Chemistry, Coimbatore	IRRI, Manila Philippines	1.10.90 to 23.11.90	Rice bio-technology training course at IRRI
29.	Dr. P. Kandaswamy Director (WTC), Coimbatore	Washington U. S. A.	7.10.90 to 27.10.90	IFPRI work on writing up the study of Demand and Supply of water in Tamil Nadu - 2010 A. D.
30.	Thiru A. Sampathrajan Assoc. Professor, Dept. of Bio-Energy, College of Agrl. Engg., Coimbatore	Royal Institute of Technology Sweeden	15.10.90 to 20.12.90	Indo-SAEEC training programme on stand alone fuel cell power plant for rural electrification in India
31.	Dr. R. Vijayaraghavan Deputy Director (Infor) Coimbatore	IRRI, Philippines	31.10.90 to 9.11.90	Training programme under ICAR - PCARRD work plan for 1989-90 to study non - formal educational programme in agriculture
32.	Dr. R. Samiyappan Associate Professor (Plant Path) Dept. of Plant Pathology, Coimbatore	U. S. A.	One year from 26.10.90	Award of Rockefeller Foundation P.G. Doctoral Fellowship for training in plant pathology at Kanasas State University, U. S. A.

33.	Dr. S. Chelliah Director of Research, Coimbatore	CNRRI, China	11.11.90 to 18.11.90	SARP workshop on simulation of potential production of rice at China
34.	Dr. S. Ramaswamy Assistant Professor (Agron) S&CMS, Coimbatore	-do-	-do-	-do-
35.	Dr. T. M. Thiagarajan Associate Professor (SS&AC), Tamil Nadu Rice Res. Institute, Aduthurai	-do-	-do-	-do-
36.	Dr. S. Mohandoss Assistant Professor (Crop Physiology) Tamil Nadu Rice Res. Institute Aduthurai	-do-	-do-	-do-
37.	Thiru V. Udayasuriyan Assistant Professor (Micro) Coimbatore	Tokyo, Japan	one year from October 1990	Award of Japanese Government Scholarship 1990-91 for the course of research study in bio-technology
38.	Dr. U. S. Sree Ramulu Professor (SS&AC), Water Technology Centre, Coimbatore	-do-	12.8.90 to 18.8.90	14th International Congress of Soil Science Symposium
39.	Thiru K. Siddeswaran Assistant Professor (Agronomy) AC & RI, Coimbatore	Bangkok Thailand	19.11.90 to 22.11.90	Symposium on sustainable farming systems held at AITC
40.	Dr. T. N. Balasubramanian Associate Professor (Agron) Krishi Vigyan Kendra, Vridhachalam	-do-	-do-	-do-

41.	Dr. L. P. Swaminathan Associate Professor (Agrl Econ) Water Technology Centre Coimbatore	IFPRI, Washington U. S. A.	14.1.90 to 22.2.91	IFPRI Collaborative project on response of major surface irrigation system to drought. Data preparation work
42.	Thiru. A. V. Venkatachalam Assistant Conservator of Forest Coimbatore	Mississippi State University, U. S. A.	Five months from 10.1.91	Indo-US Training programme on Agro-Forestry Research in U. S. A.
43.	Dr. S. Thangavelu Professor and Head, Regional Research Station, Vridhachalam	Nairobi - Keneya	January 14-18, 1991	Oilcrop Network-Steering Committee meeting held at Nairobi, Kenya
44.	Dr. V. Narasimhan Professor of Plant Path., Aduthurai	IRRI, Manila Philippines	14.1.91 to 25.1.91	Training workshop on simulation and systems analysis in rice production (SARP) held at IRRI, Manila
45.	Dr. S. Mohandass Assistant Professor (Crop Physiology) TRRI, Aduthurai	-do-	-do-	-do-
46.	Dr. S. Palanisamy Professor of Agricultural Botany TRRI, Aduthurai	-do-	-do-	-do-
47.	Thiru S. Ramaswamy Assistant Professor (Agron) S&CMS, Coimbatore	-do-	-do-	-do-
48.	Dr. K. Palanisami Associate Professor (Agril. Econ) Coimbatore	-do-	-do-	-do-

49.	Thiru M. Selvarajan Assistant Professor (Agrl. Engineering) Water Technology Centre, Coimbatore	-do-	14.1.91 to 25.1.91 and from 26.1.91 for 6 weeks	-do-
50.	Dr. SP. Palaniappan Director, S&CMS Coimbatore	Indonesia	26.2.91 to 10.3.91	International network on soil fertility and sustainable rice farming (INS-URF) of IRRI, site visit and planning meeting held at Indonesia
51.	Dr. S. Kannaiyan Professor of Bio-technology Dept. of Agrl. Microbiology Coimbatore	-do-	-do-	-do-
52.	Dr. A. P. M. Kirubakaran Soundararaj Associate Professor (Hybrid Rice) TRRI, Aduthurai	IRRI, Philippines	February 18 th to March 15th, 1991	The second International Hybrid Rice Seed Production training course to be held at IRRI, Phillippines
53.	Thiru M. Chandrasekaran Assistant Professor (Agrl. Econ) CARDS, Coimbatore	IFPRI, Washington U. S. A.	Three months from 14.2.91	TNAU-IFPRI collaborative project on Transfer of Agricultural Technology-final analysis of data
54.	Thiru S. Baskaran Assistant Professor (SS&AC) Dept. of SS&AC, Coimbatore	Massay University	From 19.2.91 to 18.2.1994	To undergo Ph. D. programme at Massay University, New Zealand
55.	Thiru G. Kumaravelu Dean, College of Forestry Coimbatore	China	From 19.3.91 to 21.3.91	Regional Seminar on Research and Development of Teak sponsored by China ESCAP / FAO

FINANCE AND ACCOUNTS

The following statement indicates the classified summary of the transactions of the university during 1990-91

		Amount (Rs. in lakhs) (Unreconciled and unaudited figures)
Details		
Opening balance as on 1.4 90	42.68	
Receipts		
Agriculture		
Non Plan	803.00	
Plan	996.76	
		1,842.44
ICAR Grant		
ICAR (Fully financed) / ICAR (Partly financed)	238.00	
Development Grant	20.00	258.00
Government of India Schemes		70.00
Outside Agencies		
Foreign and Indian Agencies		10.00
Research Schemes		33.00
Other Receipts		
(Fee, rent, farm receipts etc) Agriculture		244.33
Loans and Advances including deposit		171.00
Total		2,628.77

Scientific Workers' Conference in Horticulture

Vice-Chancellor with Cuban Scientific Delegation at ARS, Bhavanisagar

Visit of Vietnam Scientists to IPM plot in cotton at PPC, Athur

DBT Team in farmer's field

Expenditure

1.	Agriculture Non-Plan	1,015.15
2.	Agriculture Plan	1,028.94
	ICAR Fully financed schemes - Agriculture	62.00
	ICAR Partly financed schemes - Agriculture	112.57
	Government of India schemes	85.35
	Other Agencies	31.29
	ICAR Development Grant	30.00
	National Agrl. Research Project	58.09
	Krishi Vigyan Kendra, Pondicherry	8.47
	Deposit transaction including Loans & Advances	150.00
	Closing balance	46.91
	Total	2,628.77

The Finance Committee at its 38th meeting considered and recommended the budget estimate of 1990-91 of Tamil Nadu G. D. Naidu Agrl. University and recommended the estimate to the Board of Management. The annual audited accounts for the year 1988 - 89 has since been finalised. As the accounts for 1990 - 91 are yet to be compiled and sent to audit the figures furnished for the year 1990 - 91 will be treated as provisional.

University Budget Estimate for 1991 - 92

Subject to approval of full annual financial estimate of Tamil Nadu G. D. Naidu Agri. University for the year 1991-92 by the Government, the estimates are tentatively fixed as detailed below :

		(Rs. in lakhs)
Gross appropriation	:	Rs. 2,813.43
Net grant by the State Government	:	Rs. 1,975.00
Grants from ICAR including the implementation of ICAR development grants & NARP schemes	:	Rs. 370.20
Government of India	:	Rs. 179.89
Other Agencies	:	Rs. 39.34
University Receipts	:	Rs. 249.00

3. EDUCATION

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Dr. SP. Palaniappan continued as Dean (Agriculture) upto 28.10.90 and Dr. G. Soundarapandian assumed charge as Dean (Agriculture), Coimbatore on 29.10.90. The college offered B.Sc. (Agri) degree programme under the trimester system. The number of students on roll (boys and girls) in different years of the degree programme are furnished below :

Degree programme	Year	Boys	Girls	Total	Date of commencement of I Trimester
B.Sc. (Agri)	I	55	27	82	8.11.90
	II	30	93	123	11.6.90
	III	32	82	114	14.11.90
	IV	68	66	134	13.6.90

Education Tour

Study tours were conducted for the II and III year B.Sc. (Ag.) students, under the courses AGR. 205 (0+1) and AGR. 305 (0+1) respectively. For AGR. 205, 132 students were taken in two batches to the following research stations between 20.1.91 and 26.1.91.

1. Sugarcane Research Station, Sirugamani,
2. Tamil Nadu Rice Research Institute, Aduthurai,
3. Sugarcane Research Station, Cuddalore,
4. Krishi Vigyan Kendra, Pondicherry,
5. Agricultural Research Station, Vridhachalam and
6. Horticultural Reaserch Station, Yercaud.

They were exposed to the different agro-climatic regions and taught about the existing cropping pattern, soil types, common package of practices and socio-economic conditions of the local farming community.

For AGR. 305, 112 students were taken in two batches to the following research stations of the southern districts between 29.1.91 and 4.2.91.

1. Horticultural Research Station, Periyakulam,
2. Cotton Research Station, Srivilliputhur,
3. Model Orchard, Courtrallam,
4. Rice Research Station, Ambasamudram,
5. Fisheries College and SPIC, Tuticorin,
6. Agricultural Research Station, Kovilpatti,
7. Regional Research Station, Aruppukottai,
8. Agricultural College and Res. Institute, Madurai,
9. Tobacco Research Station, Vedasanthur and
10. Pandiarajapuram Sugar Factory.

All India Study Tour

The All India Study Tour for the year 1990-91 was organised during February and March 1991. A total number of 144 students of B.Sc. (Ag.) participated in the tour. The students were taken in two batches accompained by two teachers per batch. The tour was for a period of 15 days. The students visited institutions related to Agriculture, Horticulture and Forestry in Madras, Hyderabad, New Delhi, Hissar, Agra and Dehra Dun.

Village Stay Programme

The final B.Sc. (Ag.) students had undergone the one month Village Stay Programme from 8.1.91 to 7.2.91. The students (both boys and girls) numbering 144 were placed in 25 locations in the districts of Periyar, Salem and Dharmapuri. They studied the socio-economic characters of the rural families, especially the farmers. They learnt different methods of farming by closely associating and interacting with them. Identified TNGDNAU staff members and the officials of the State Departments of Agriculture and Horticulture were involved in guiding the students during their stay. The students organised group meetings, exhibitions and conducted a number of method demonstrations on the latest agricultural techniques, viz., importance of biofertilizers, mushroom cultivation, rat control, parthenium control, coir pith decomposition, seed hardening, etc. Besides the students conducted tree planting campaigns and adult education programmes in villages. They have also enrolled farmers as subscribers for the TNGDNAU journal 'Valarum Velanmai'.

Scholarships

A numbr of scholarships were made available to the students. The following is the list of scholarships availed by the students.

Sl. No.	Name of the scholarship	No. of receipients	Total amount
1.	SC Scholarship	53	1,63,603
2.	SC Loan Scholarship	60	90,000
3.	BC / MBC Scholarship	108	1,27,340
4.	National Merit Scholarship	19	58,270
5.	Gandhi Memorial and Bright Students Award	2	1,920
6.	Pondicherry Post Metric Scholarship	11	25,447
7.	Andaman & Nicobar Administration	7	16,670
8.	TNGDNAU Merit Scholarship	36	14,670
9.	Adhoc Merit Scholarship	11	3,300
10.	Perarignar Anna Award	1	1,000
11.	Indo-Ethiopian Cultural Exchange	1	10,115
12.	General Cultural Scholarship	3	34,218
13.	Award of Prize Money to SC/ST students securing 60% marks in Post Metric Level	16	24,000

Students Hostel

The students including boys and girls were accommodated in various hostels. Seven messes were functioning efficiently and economically on the basis of dividing system. The mess representatives nominated by the warden in consultation with the students managed the messes successfully. Most of the academic requirements, viz., record note books, papers, herbarium sheets, etc. besides eatables and cosmetics for the students were supplied by the Students' Canteen. The University Medical Officer took care of the medical facilities of the inmates of the hostel. The lady Medical Officer was attending to the medical needs of girl students in Ladies' Hostel by visiting the hostel daily between 4.00 and 5.00 p.m.

Students' Club

Students' Club inaugural function was conducted in a grand manner on 15.2.91. Dr. G. Soundrapandian, Dean (Agriculture) presided and Thiru B. R. Bhasker, I.F.S., Principal, State Forest Service College, Coimbatore was the the Chief Guest and he also delivered the inaugural address.

Students Club and Executive Council Meetings were conducted on 20.12.90 and 12.2.91 respectively at Freeman Hall. Dr. G. Soundrapandian, Dean (Agri) presided over the meetings.

The students participated in a number of literary events and competitions and brought out their talents in arts, photography and light music, etc.

Dr. Ambedkar Centenary Debating Competitions for College students both in English and Tamil were organised and conducted on 14.3.91 at Freeman Hall.

Orchestra team participated in State Level Inter-collegiate Cultural Meet organised by Dalmia Cements, Trichy on 10.2.91 and won the first place for best advertisement programme. The orchestra society gave a cultural programme to Sandoz Company on 5.3.91 at Anna Auditorium and participated in CASCALL 1991 organised and conducted by PSG College of Arts and Science on 8.3.91 and 9.3.91 and also gave a radio programme on 13.3.91 at Coimbatore All India Radio Station.

Social Service League

The inaugural function for the year 1990-91 was celebrated in a grand manner on 7.12.90. Prizes and stitched uniforms were distributed to the winners of various competitions and poor children respectively.

Sports and Games

Main campus students participated in Tamil Nadu G. D. Naidu Agricultural University Inter-Collegiate Athletic Meet held at Agricultural College and Researh Institute, Killikulam from 24.3.91 to 27.3.91.

Vice-Chancellor's Cup Hockey Tournament was conducted at main campus. Coimbatore main campus Hockey Team won winners trophy and Sri Venkateswara Paper Mills, Udumalpet was the runners-up.

Kalaimani Memorial Football tournament was conducted from 23.1.91 to 25.1.91 at the main campus. Dr. G. Soundrapandian, Dean (Agri) inagurated the tournament on 23.1.91 and Dr. I. Irulappan, Dean (Horticulture) distributed the prizes to the winners and runners on 25.1.91.

College volley ball, football, tennis, hockey, cricket, kabadi and table tennis teams participated in many friendly matches and tournaments and exhibited their talents.

National Service Scheme

The National Service Scheme of the University had a strength of 700 student volunteers. The NSS volunteers actively participated in the various useful activities like Parthenium eradication, campus development, adult education, tree planting, road relaying, check dam construction, blood donation, etc. The volunteers also took part in the Science Day and Convocation. Besides they conducted method demonstrations, night patrolling and integrated pest management, etc. During the year, three special camps were conducted in villages near Coimbatore,

Madurai and Killikulam. The University Level NSS Advisory Committee meeting was convened on 7.1.91 under the Chairmanship of Dr. S. Jayaraj, Vice-Chancellor Tamil Nadu G. D. Naidu Agrl. University, Coimbatore-3.

COLLEGE OF HORTICULTURE, COIMBATORE

Dr. I. Irulappan was the Dean (Hort) during the period under report. The Faculty of of Horticulture continued to offer B. Sc. (Hort), M.Sc. (Hort), and Ph. D. degree programmes under the trimester system of education. The faculty also offered courses to B.Sc.(Ag), B. Sc. (Forestry) and B. E. (Ag.) degree programmes.

Admission

The number of students on roll in I, II, III and IV year B. Sc. (Hort) is as follows :

	Total	Boys	Girls
I B. Sc. (Hort)	36	24	12
II B. Sc. (Hort)	47	31	16
III B. Sc. (Hort)	54	21	33
IV B. Sc. (Hort)	58	25	33

Educational Tour

Final B.Sc. (Hort) students participated in an all India tour for 15 days during February 24-March 12, 1991 to Mysore, Bangalore, New Delhi, Hissar, Hyderabad, Mussori, etc. Final B.Sc. (Hort) students participated in a training programme on plantation crops at Coonoor for a period of one week during October, 1990.

Village Stay Programme

Final year B.Sc. (Hort) students numbering 59 were divided into 10 groups and they stayed at 10 different places in Kodaikanal, Dharmapuri and Salem for one month from January 1, 1991 to February 2, 1991. They conducted method demonstrations and participated in the Monthly T & V meetings, etc.

COLLEGE OF AGRICULTURAL ENGINEERING, COIMBATORE

Prof. K. R. Swaminathan, continued as Dean (Engg.). The faculty continued to offer B. E. (Ag.) degree programme besides offering courses in agricultural engineering for B.Sc. (Ag.), B.Sc. (Forestry) and B.Sc. Hort) students. M.E. (Ag.) and Ph.D. degree programmes in Soil and Water Conservation, Farm Machinery and Power, Post Harvest Technology and Agro Energy and Power were also offered under the trimester system.

Admission

One hundred and ten students were admitted to I.B.E. (Ag.) course. The first trimester for the I.B.E. (Ag.) commenced on 8.11 90 and for the II, III and Final BE (Ag) on 2.1.91, 2.1.91 and 21.12.90 respectively. The number of students as on roll in I, II, III & IV year B. E. (Ag.) was as follows.

Class	Boys	Girls	Total
I B. E. (Ag.)	77	33	110
II B. E. (Ag.)	56	14	70
III B. E. (Ag.)	82	18	100
IV B. E. (Ag.)	48	2	50
Total	263	67	330

Educational tour

The III B. E. (Ag.) students were on Tamil Nadu State Study Tour from 5.6.90 to 12.6.90 and they visited the following industries and institutions.

Seshasayee Paper Mills, Erode; Sago Factory, Micro Level Hydro Electric Project, Mettur Chemicals and Metkam Silicon, Mettur Dam; NAFED Processed Foods and Institute of Hydraulics and Hydrology, Vellore; T.T.T.I. and 'J' FARM, Madras; Sri Murugappa Chettiar Research Institute, Tharamani; Drip Irrigation System, Mahabalipuram; CIPET, Guindy; Integral Coach Factory, Perambur; National Engineering Company Ltd., Ambatur; Thermal Power Station, Neyveli; Annamalai University, Chidamparam; PPRC and Modern Rice Mill, Thiruvarur; BHEL, Bharathidasan University, School of Energy, Irrigation Management and Training Institute, KVK and SSRC and Grand Anaicut, Trichy; Cauvery Sugar and Chemicals, Pattaivaithalai; Pugalur Paper Mills, Pugalur and Pongalur Watershed, Pongalur.

The Final year students went on All India Study Tour from 12.1.91. to 30.1.91 and they visited the following Institutions and Industrial Organisation.

a. Indian Agricultural Research Institute, Water Technology Centre and Centre for Rural Development and Appropriate Technology, New Delhi.

b. Central Soil and Water Conservation Research Institute, Dehra Dun.

c. International Tractors Ltd., American Springs and Pressing Works Ltd., I.I.T. and Marine Drive, Bombay.

d. University of Agricultural Sciences, Bharat Earth Movers Ltd. and Visweswarayah Technical Museum, Bangalore.

Practical Training

The III B. E. (Ag.) students were on Practical Training from 28.11.90 to 20.12.90 in the following organisations.

a. TUCAS, Tudiyalur, Coimbatore,

b. Office of the Assistant Executive Engineer (Mech) and Executive Engineer, Tractor Workshop, Coimbatore,

c. Office of the Executive Engineer (RVP) and TANTEA, Coonoor and

d. Office of the Assistant Executive Engineer, CADP, Gopichettipalayam.

Scholarships

Details of scholarships awarded during 1990-91 are furnished below :

S. No.	Name of the Scholarship	No. of receipients
1.	ICAR Merit Scholarship	30
2.	Scheduled Caste Loan	52
3.	Scheduled Caste Scholarship	50
4.	Teachers' Welfare Scholarship	2
5.	Backward Classes Scholarship	78
6.	TNAU Merit Scholarship - UG	30
7.	National Merit Scholarship	16
8.	Govt. of Pondicherry Scholarship	2
9.	Ex-Servicemen Scholarship	2
10.	USAID Scholarship	2
11.	CFTC Scholarship	1
12.	Arunachal Pradesh Government Scholarship	2
13.	Nagaland Government Scholarship	2
14.	Indo-Ethiopian Exchange Cultural Programme Scholarship	3
15	.Jammu and Kashmir State Loan Scholarship	1
16.	Gandhi Memorial Prize Award	1
17.	S. J. Jindal Trust Scholarship	1
18.	Andaman Nicobar Island Scholarship	2
19.	TNGDNAU Merit Scholarship - PG	2
	Total	279

Students' Hostel

Dr. M. Balasubramanian, Professor and Head, Department of Farm Machinery continued as warden. He was assisted by two deputy wardens. Students office bearers were also elected to help in the functioning of the hostel. Regular meetings of the mess representatives were held to discuss the points for smooth management of the messes.

There were 293 students residing in the hostel including 78 lady students in the ladies hostel.

COLLEGE OF FORESTRY, COIMBATORE

College of Forestry was established on September 15, 1989 with Prof. G. Kumaravelu, IFS, as Dean (Forestry). The college offered B.Sc. (Forestry), M. Sc. (Forestry) and Ph.D. (Forestry) degree programmes. The trimester system of education was followed for all the degree programmes.

Admission

The number of students on role in I, II, III, and IV year B. Sc. (Forestry), M. Sc. (Forestry) and Ph.D (Forestry) was as follows.

	Boys	Girls	Total
I B.Sc. (Forestry)	21	1	22
II B.Sc. (Forestry)	13	1	14
III B.Sc. (Forestry)	17	1	18
IV B.Sc. (Forestry)	18	0	18
I M.Sc. (Forestry)	3	1	4
II M.Sc. (Forestry)	4	1	5
I Ph.D. (Forestry)	3	0	3
Total	79	5	84

Educational Tour

Thirteen students of II B.Sc. (Forestry) were on educational tour from 2.1.91 to 8.1.91. They visited forests in Top Slip, Siruvani, Bollampatty and Mudhumalai. They also visited the scrub jungle at Mettupalayam.

Forest Stay Programme

The final year B.Sc. (Forestry) students were on forestry stay programme for one month from 25.2.91 to 27.3.91. The students were placed in Bollampatty, Top Slip and Mettupalayam ranges at the rate of six students in each range.

During this programme the students learnt about the forest types, wild life, forest operations, elephant camps, timber sales, tribal settlement, fire protection measures, etc.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, MADURAI

Dr. S. Sankaran was the Dean during the period under report. There were 14 departments, ten under the Faculty of Agriculture and four under the Faculty of Basic Sciences and Humanities. Ph.D. programme in six disciplines has been introduced from the year 1989-90.

Admission

The number of students on roll was as follows :

	Boys	Girls	Total
I B.Sc. (Ag.)	73	54	127
II B,Sc. (Ag.)	18	56	74
III B.Sc. (Ag.)	29	56	85
IV B.Sc. (Ag.)	21	72	93
I B.Sc. (HSc)	3	10	13
II B.Sc. (HSc)	—	8	8
III B.Sc. (HSc)	3	9	12
I M.Sc. (Ag.)	33	33	66
II M.Sc. (Ag.)	22	34	57
Ph.D.	40	9	49
Ph.D. (FS & N)	—	3	3
Total	242	345	587

Seventy six B.Sc. (Ag.) second year students were taken on educational tour to Regional Research Station, Kovilpatti; Agricultural College, Killikulam; Rice Research Station, Ambasamudram; Cotton Research Station, Srivilliputhur and Horticultural Research Station, Periyakulam and also to Vaigai Dam from 10.12.90 to 14.12.90 in two batches

Eighty three B.Sc. (Ag.) third year students were taken on an educational tour to Vedasandur, Mettupalayam, Bhavanisagar, Sirumugai, Trichy, Thanjavur, Aduthurai, Veppankulam, Vamban and Tamil Nadu Agricultural University, Coimbatore and also Sugarcane Breeding Institute, Coimbatore from 17.12.90 to 23.12.90.

Village Stay Programme

This programme was organised in 6 villages for a period of 30 days from 20.12.90 to 18.1.91. During their stay, the students organised and conducted method demonstrations on latest aspects of farm technologies.

Scholarships

Sl. No.	Name of Scholarships/fellowships	UG	PG	Total
1.	Adidravidar Welfare Scholarship and	37	5	42
	Adidravidar Welfare Loan Scholarship	30	5	35
2.	Backward Classes Welfare Scholarship	59	9	68
3.	ICAR Junior Fellowship	—	26	26
4.	ICAR Senior Fellowship	2	2	2
5.	DNT Scholarship	2	1	3
6.	Madras Fertilizers Ltd., Fellowship	—	1	1
7.	Godrej soap Ltd., Fellowship	—	1	1
8.	Minor tuber crops	—	1	1
9.	Arunachalam Shastiabthapoorthy Scholarship	1	—	1
10.	Farmers Committee Fund Scholarship	1	—	1
11.	S.J. Jindal Trust Scholarship	1	—	1
12.	Pondicherry State Scholarship	—	2	2
13.	National Merit Scholarship	27	—	27
14.	Agri. Merit Scholarship	32	26	58
15.	Adhoc merit grant	14	—	14
16.	Bright Students Award	2	—	2
17.	Merit cum means Award	—	1	1
18.	National Loan Scholarship	1	—	1
19.	Prize money (SC/ST)	—	7	7
20.	Anna Memorial Award (Prize amount)	2	—	2

Students' Hostel

There were five hostels functioning in this campus to accommodate the students. During 1990-91, 198 boys and 348 girl students were accommodated in the hostels. The hostel was administered by the Dean. He was assisted by a warden, three deputy wardens, and three resident tutors besides administrative personnel.

Students' Club

The students' club activities were inaugurated on 28.11.90 by the Vice-Chancellor Dr. S. Jayaraj and he also released the "TRIUMPH" magazine. Dr. S. Sankaran, Dean, welcomed the gathering. The students participated in a number of literary events and proved their talents in arts, photography, orational elegance, light music, etc.

Sports and Games

Inter-university south zone volley ball tournament for the year 1990-91 was organised and held at AC & RI., Madurai. Dr. S. Sankaran, Dean, presided over the inagural function. Three students represented the college in the inter-university hockey tournament held at Nagarjuna University, Andhra Pradesh. In connection with Pongal, inter-class matches were conducted for boys and girls. The volley ball and Kabadi teams participated in the inter collegiate games held at PAJANCOA, Karaikal. The cricket and tennis teams participated in number of tournaments and friendly matches.

National Cadet Corps

Forty cadets belonging to different classes of B.Sc. (Ag.) and B.Sc. (H.Sc.) were enrolled during this period. Training in foot drill, weapon handling, field craft, map reading and first aid was imparted to the cadets. Thirteen cadets attended the annual training camp at Pattiveeranpatti from December 24, 1990 to January 26, 1991. Dr. S. Sankaran, Dean, hoisted the National Flag and distributed certificates to the NCC cadets.

National Service Scheme

The NSS special camp for the year 1990-91 was conducted at Ayathampatti village. During the camp, the students constructed a check wall across the gully in the village tank using the locally available materials. One day camp for cattle and poultry maintenance was organised. In the camp, during evening hours, cultural programmes were arranged by the student volunteers involving the villagers.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, KILLIKULAM

Dr. M. Rangarajan was the Dean during the period under report. The College offered B.Sc. (Ag.) and M. Sc. (Ag.) degree programmes under trimester system.

Admission

The number of students on roll during the year was as follow :

	Boys	Girls	Total
B. Sc. (Ag.)	43	69	112
M. Sc. (Ag.)	17	6	23
Total	60	75	135

Educational Tour

Third year B. Sc. (Ag.) students visited Tobacco Research Station, Vedasanthur; TNGDNAU main campus, Coimbatore; Government Botanic Garden, Ootacamund; Forest Research Station, Mettupalayam and other research stations of the University at Paiyur, Cuddalore, Vridhachalam, Trichy, Pudukottai and Vamban. A similar study tour was arranged for the II B. Sc. (Ag.) students from 27.2.91 to 4.3.91. The students visited seven research stations of the university.

Village Stay Programme

Final year students stayed along with identified progressive farmers of southern districts of Tamil Nadu. During the programme the students learnt local cultivation practices and the farmers' problems in agriculture. They were also in touch with functionaries of the extension department and T & V contact farmers. They organised method demonstrations and participated in the fortnightly meetings of T & V programme along with agricultural officers.

Scholarships

Sl. No.	Name of the Scholarship	No. of receipients
1.	Backward Class Scholarship	113
2.	Govt. of India - SC Scholarship	65
3.	Govt. of India - Loan Scholarship	34
4.	Pondicherry Post Matric Scholarship	2
5.	Bright Student Award	2
6.	National Merit Scholarship	6
7.	National Loan Scholarship	1
8.	Teachers Welfare Scholarships	1
9.	ICAR Post Matric Scholarship	3
10.	Gandhi Memorial Award	2
11.	Physically Handicapped Scholarship	2
12.	Adhoc Merit Grant	11
13.	Ex-Servicemen Welfare Scholarship	2
14.	Andaman-Nicobar Island Scholarship	1
15.	Prize Money Award	3
16.	TNAU, Merit Scholarship	2
17.	ICAR Junior Fellowship	2

Students' Hostel

The hostel was run under the chairmanship of Dean who was assisted by a warden and two deputy wardens. The messes were run on dividing system actively involving student representatives with committees for purchase of materials and preparation of menu, etc. A full time medical officer attended on the students and provided medical care.

Students' Club

Students' club activities for 1990-91 were inagurated on 23.6.1990. Four final year B.Sc. (Ag.) students participated in the "Best Athlete" of pro-chancellors' prize competition held at Tamil Nadu G. D. Naidu Agricultural University, Coimbatore on June 19-20, 1990. Two students participated in the "Best orator" of Chief Ministers' prize competition held at Coimbatore on June 20, 1990.

National Service Scheme

The National Service Scheme volunteers assisted in institutional development work like maintenance of lawns, roads, cleaning the surroundings of class rooms, etc. The students have also organised tree planting programmes, free medical camps, crop health camp, etc., for the benefit of farming community. A special NSS Camp was organised for 10 days from 16.3.91 to 25.3.91. Forty students and five village youths participated in this camp.

ANBIL DHARMALINGAM AGRICULTURAL COLLEGE, KUMULUR

Dr. G. Ramanathan continued as the Dean during the period under report. The college offered B.Sc. (Ag.) degree programme under trimester system.

The number of students on roll during the year was as follows :

Admission

Year	No. of students (Boys)
I B. Sc. (Ag.)	51
II B. Sc. (Ag.)	43

Educational Tour

The II B.Sc. (Ag) students were taken on tour to the following places.

Central Tobacco Research Centre, Vedasandur; Horticultural College, Periyakulam; Cotton Research Station and Palmayrah Research Station, Srivilliputhur; Sericulture Centre, Tenkasi; Government Orchard, Kuttalam; Fisheries College and SPIC Plant, Tuticorin; Agricultural Research Station, Aruppukkottai and Agricultural College and Research Institute, Madurai.

Students' Hostel

In all 95 students have been accommodated in the hostel. The hostel was run under the chairmanship of the Dean. The messes were run on dividing system actively involving student representatives for the purchase of materials and preparation of menu, etc. A part-time medical officer attended on the students and provided medical care.

COLLEGE OF HORTICULTURE, PERIYAKULAM

During the academic year, the under-graduate programme in horticulture has been shifted to Horticultural Research Station, Periyakulam. Dr. A. Arumugam was appointed as Dean. The College offered B. Sc. (Hort) degree programme under trimester system.

Admission

Thirty seven students, comprising 24 boys and 13 girls were admitted in B.Sc. (Hort) programme for the academic year 1990-91 as the first batch of entrants.

Students' Hostel

At present the girl students were housed in Annapackiam College Hostel at Periyakulam. Boy students were accommodated in the students hostel at the campus. The hostel was run by the Dean who was assisted by two deputy wardens. A part-time medical officer was attending on the medical needs of the students.

POST-GRADUATE EDUCATION

Dr. G. V. Kothandaraman continued as Dean (PGS) upto 28.2.91. Dr. M. Gopalan assumed charge as Dean (PGS) on 1.3.91. Masters degree programme was offered in 24 disciplines in Agriculture, Horticulture, Agricultural Engineering, Forestry and Food Science and Nutrition. In addition, Post-Graduate Diploma in Sericulture was also offered during the year.

Admission

During 1990-91, 237 students were admitted for various masters degree programme in Agriculture, Horticulture, Agricultural Engineering, Forestry and Food Science and Nutrition. Under doctoral programme, 113 scholars were admitted in Agriculture, Horticulture, Agricultural Engineering and Food Science and Nutrition. M.Sc.(Ag.) programme was started at Agricultural College and Research Institute, Killikulam, Thirunelveli in six disciplines, viz., Agronomy, Plant Breeding and Genetics, Soil Science and Agricultural Chemistry, Agricultural Entomology, Agricultural Economics and Agricultural Extension. During the period under report, 61 teachers from Agriculture, 3 from Horticulture, 8 from Agricultural Engineering and one from Food Science and Nutrition were selected under part-time programme.

Details regarding the number of students admitted and passed out from various post-graduate programmes of the university during 1990-91 are furnished below :

a) Masters' degree programme

S. No.	Discipline	Coimbatore Boys	Coimbatore Girls	Madurai Boys	Madurai Girls	Killikulam Boys	Killikulam Girls	Total	No. of students passed out
1.	Agronomy	6	3	6	4	—	—	19	20
2.	Plant Breeding & Genetics	9	6	5	4	1	4	29	16
3.	Soil Sci. & Agrl. Chemistry	1	4	—	5	2	2	14	16
4.	Agrl. Entomology	2	3	3	2	4	1	15	16
5.	Plant Pathology	7	3	3	2	—	—	15	8
6.	Agrl. Economics	3	4	2	3	4	0	16	15
7.	Agrl. Extension	4	4	8	4	3	2	25	17
8.	Agrl. Marketing Management	6	2	—	—	—	—	8	—
9.	Agrl. Microbiology	4	1	3	2	—	—	10	6
10.	Seed Technology	3	5	—	—	—	—	8	7
11.	Plant Pathology	1	4	—	—	—	—	5	—
12.	Plant Protection	3	—	—	—	—	—	3	1
13.	Crop Physiology	—	—	1	2	—	—	3	2
14.	Sugarcane Production	4	—	—	—	—	—	4	3
15.	Horticulture	5	5	3	2	—	—	15	11
16.	Forestry	4	1	—	—	—	—	5	—
17.	Bio-technology	7	5	—	—	—	—	12	8
18.	Environmental Sciences	2	3	—	—	—	—	5	—
19.	M.B.M.	7	1	—	—	—	—	8	7
20.	Post-Harvest Technology	3	2	—	—	—	—	5	2
21.	Soil & Water Conservation	3	2	—	—	—	—	5	—
22.	Agro Energy & Power	—	—	—	—	—	—	—	2
23.	Water Management	—	2	—	—	—	—	2	—
24.	Food Science & Nutrition	—	—	2	2	—	—	4	2
	Total	84	60	36	32	14	9	235	159

b) **Ph. D. degree programme**

S No.	Discipline	Coimbatore Part time	Coimbatore Full time	Madurai Part time	Madurai Full time	Total	No. of students passed out
1.	Agronomy	7	1	3	2	13	13
2.	Plant Breeding & Genetics	6	4	4	1	15	9
3.	Agrl. Entomology	4	4	4	1	13	7
4.	Soil Science & Agrl. Chemistry	4	3	2	2	11	8
5.	Plant Pathology	3	2	2	3	10	5
6.	Agrl. Economics	3	1	—	—	4	7
7.	Agrl. Extension	3	2	—	—	5	10
8.	Seed Technology	2	1	—	—	3	1
9.	Agrl. Microbiology	3	2	—	—	5	1
10.	Crop Physiology	2	1	—	—	3	3
11.	Bio-technology	2	3	—	—	5	—
12.	Forestry	3	1	—	—	4	—
13.	Plant Nematology	3	—	—	—	3	—
14.	Environmental Science	1	3	—	—	4	—
15.	Horticulture	3	3	—	—	6	2
16.	Food Science & Nutrition	—	—	1	—	1	—
17.	Agrl. Engineering	8	—	—	—	8	—
	Total	57	31	16	9	113	66

Scholarships and Fellowships

The following scholarships, fellowships and stipends have been awarded to post-graduate students of various discipline during 1990-91.

S. No.	Particulars	Senior	Junior	Total
1.	I. C. A. R.	—	50	50
2.	Bio-technology studentships	—	12	12
3.	Rastriya Chemicals	—	1	1
4.	TNGDNAU Merit Sholarships	—	42	42
5.	Tuticorin Alkali Chemicals	1	—	1
6.	Ghardha Chemicals Ltd., Bombay	—	1	1
	Total	1	106	107

University Library

The Tamil Nadu G. D. Naidu Agricultural University Library possesses high standard unique collections of research reports and scientific periodicals in the fields of Agriculture, Horticulture, Forestry, Fisheries, Agricultural Engineering, Bio-technology and other allied subjects. It is housed in a well equiped modern building.

Apart from printed materials, the library possesses substantial microform holdings, reprints, pamphlets, leaflets, reports and maps. In addition to reference services, the library conducts orientation classes to guide the students for effective utilisation of the books and other facilities. The inter-library loan facility is available in the library. This facilitates the exchange of documents on reciprocal basis from other universities, colleges, academic and research institutions both at national and international levels. The library is kept open for reference from 9.00 a.m. to 9.00 p.m. on all working days and from 8.00 a.m. to 2.00 p.m. on Sundays excluding public holidays.

During the academic year 1990-91, 1007 books have been added to the existing collection. The additions included 184 gratis books, 104 theses and 58 advances and annual reviews. The library purchased 661 books during the year. Presently the library has 1,33,660 books and periodical back files.

During the year, the library received 6637 single issues of periodicals. The library subscribed for 840 journals out of which 492 were foreign, 204 Indian and 124 and 20 journals were received as gratis and exchange respectively. Under technical processing work, 662 documents were classified, catalogued and arranged according to classified order.

The library collections were utilized by 77,956 readers who referred 12,54,783 documents. In the charging counter, 77,636 books were issued on loan for home reading. In addition to this 5,705 readers were rendered reference assistance.

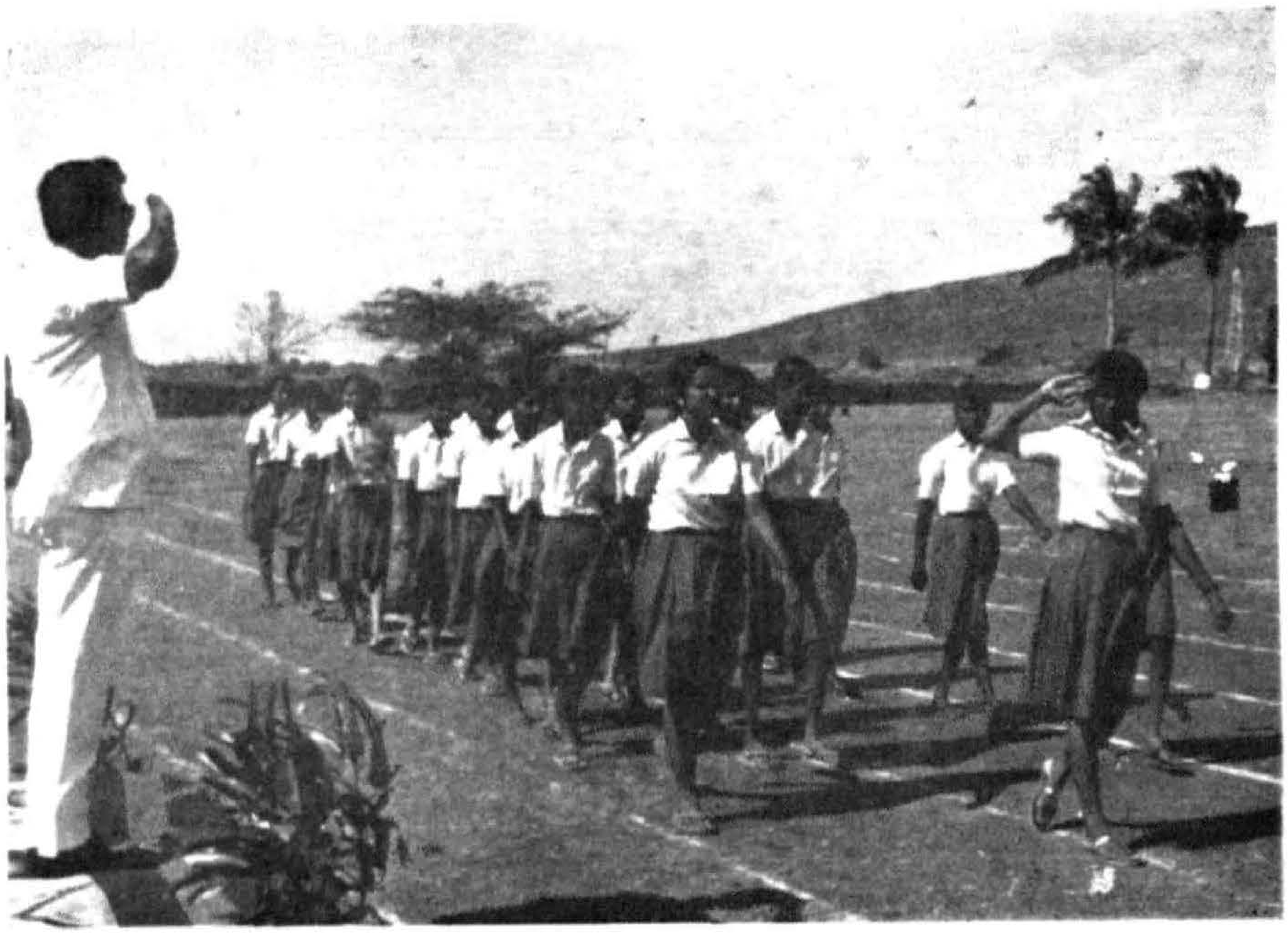
Fifteen instruction classes were held for the under-graduate and post-graduate students and research scholars. The Library Committee met three times and discussed ways and means to improve library facilities so as to render effective service to the users. During the academic year under report, computer and xerox facilities have been established in the library to provide quick documentation service.

A separate Students Library has been functioning in the Old Library Block at Anna Auditorium for the benefit of under-graduate students. It functions from 5.00 p.m. to 9.00 p.m. on all working days. All the text books pertaining to under-graduate classes were made available subject-wise. Only the under-graduate

Fifteenth Convocation

On-farm practicals for students

Demonstration by students, AC & RI, Madurai



Sports Day at AC & RI, Killikulam

Village Stay Programme - Demonstration by final B. Sc. (Ag.) students
AC & RI, Coimbatore

students were allowed to have transaction of books. The post-graduate students, reseach scholars and staff are permitted to utilize the Students Library for reference only. The Students Library was utilized by 15,944 students who referred 2,50,690 books. In the charging counter 12,643 books were issued on loan for home reading.

Transfer of books

For the benefit of the Under-Graduate students at Agrl. College and Research Institute, Killikulam and Anbil Dharmalingam College of Agriculture, Kumulur, College of Horticulture, Periyakulam and College of Forestry, Mettupalayam, text books for each college have been transferred from Tamil
University library.

4. RESEARCH

The major research achievements of the University in the areas of crop improvement, horticulture, agricultural engineering, water technology and agricultural and rural development studies are presented below :

AGRICULTURE

RICE

Crop Improvement

Varieties Released

ASD 18 : It is a cross derived semi dwarf variety maturing in 105-110 days. It is suitable for summer, kharif and late rabi sowings. It records a grain yield of 8.5 t/ha which is higher than TKM 9 and IR 50. It has resistance to blast and moderate resistance to sheath rot and RTV. The grain is medium slender.

MDU 4 : The culture ACM 16 (AC 2836 x Jagannath) has been released as MDU 4. It has a duration of 120-125 days with tolerance to cold stress. It has a yield potential of 5.88 t/ha. This variety also possesses moderate resistance to BPH, WBPH and brown spot. It is also highly resistant to leaf blast, neck infection, sheath rot and grain discolouration. It is highly suitable for cold stress affected areas of Madurai, Dharmapuri and Salem districts.

Promising cultures

TNAU 88013 (IR 50 x TNAU 80058) : This culture, maturing in 115 days, has recorded on an average 15 per cent increased yield over IR 50. It has resistance to blast and BPH and has been advanced to ART during 1991-92.

ACM 37 : This culture matures in 105-110 days. This culture has been recommended for ART under semi-dry conditions in six southern districts viz., Ramnad, Pasumpon, Kamarajar, Chengai-Anna, Kanyakumari and Chidambaranar.

TM 6012 (C 22/BJ 1) : This culture has been recommended for repeat test based on its good earlier performance in ART.

MS 210, IET 11689 and IET 10889 : These three medium slender rice cultures were identified for ART in the state during 1991-92 under IR 50 improvement programme.

AD 6465 : This long duration culture was recommended for ART to replace Ponni and ADT 40 in three districts, viz., Thanjavur, Pondicherry and Kanyakumari.

AS 13744, AS 18696 and IET 11420 : These three short duration (below 100 days) cultures were advanced to ART under semi-dry conditions in Kanyakumari district.

Hybrid rice

Two high yielding stable hybrids, viz., TNRH 1, (IR 628299xIR 10198-66-2R) and TNRH 2 (IR 58025 A x IR 10198-66-2R) with long slender grains had already been advanced for multilocation trials during summer 1991.

Seed production of parents (CMS lines and maintainers and restorers) and the two hybrids have been taken up during current navarai season.

Crop Management

In Periyar-Vaigai command area, groundnut and blackgram-rice-sesamum were found to be a viable system with high rice yield equivalent (18.3 t/ha) and net income of Rs. 31075 ha^{-1} with 91 per cent additional income over the existing system of rice-rice-fallow. This system increased employment opportunities by 160 man days with a saving of 38 cm (17%) in water consumption over the existing system.

In Periyar-Vaigai command area, under constraints of irrigation water, cropl sequence groundnut-rice-blackgram was found to be the best among the severa systems studied. The total water used for this crop sequence was 22 per cent less with a consumptive use of 242 cm of water. The net return was also high (Rs. 14,478/ha) by 20 per cent compared to the conventional system of rice-rice-blackgram (Rs. 11,650/ha).

For maximising rice yield in Thamirabarani tract during pishanum season (130 days rice crop) fertilization with 150 : 60 : 60 kg NPK/ha with a spacing of 20 x 20 cm (25 hills/sq.m) should be adopted with five equal splits of N and two equal splits of K.

To achieve high biomass of *S. rostrata*, sowing the seeds behind country plough at the rate of 50 kg/ha was found to be appropriate.

A critical limit of 1.15 ppm DTPA-Zn was fixed to identify the Zn deficient rice soils of cumbum valley tract. Application of 2.5 ppm Zn (25 kg Zn SO_4/ha) was found to be sufficient for high grain yield. For site specific zinc fertilization of deficient soils of the area, a dose of 46 kg Zn SO_4/ha (4.6 ppm Zn) was arrived at for high rice yield. Zinc application improved the protein content in grain.

Experiments conducted in Thanjavur New Delta soils to assess the needs of micronutrient for direct sown rice showed that individual or combined application

of iron or zinc increased the rice grain yield. Application of Zn SO_4 @ 25 kg/ha^{-1} increased the yield to the tune of 10.9% (5.09 t/ha) over NPK alone (4.59 t/ha^{-1}) whereas in combination with 50 kg Fe SO_4/ha^{-1} the yield was enhanced to the tune of 16.4 per cent. Foliar application of Fe SO_4 either alone or in combination with Zn SO_4 also significantly increased the grain yield (11.7%).

Studies on the changes in soil physical and chemical properties of saline soils influenced by sub-surface drainage indicated that out of the two types of drainage pipes' PVC pipes were better than clay pipes. As the size of the pipes increased, there was increased yield. The optimum lateral distance was found to be 15 meters in the case of PVC pipes and 20 meters in the case of clay pipes. The cost of laying out the pipes was worked out to be approximately Rs. 10,000/- per ha and the yield increase due to this provision of drainage was found to be 3000 kg/ha over control (without provision of drainage).

For lowland rice under the Madurai condition, the strain *Azospirillum linoferum* (IPI) was found to be superior over the earlier strains of *Azospirillum* MDU 101 and MDU 204.

Evaluation of rice based farming systems for Cauvery Delta revealed that rice-rice-cotton and fodder grass + legumes with goats in deep litter system and rice-rice-cotton + maize with duck cum fish culture gave respectively high net return of Rs. 24,360/ha (103% over control) and Rs. 24,120/ha (101% over control). Rice-rice-cotton and NB 21 grass + legume with diarying (3 cows + calves) gave only 66% increase in net Income, but registered highest employment generation of 702 man days (140% increase over existing cropping system).

The results of the 15_N studies carried out since 1983 revealed that the basal dose of fertilizer N had given the efficiency of about 6.0 per cent. Hence, the efficiency of fertilizer N could be increased by reducing the presently recommended basal level of N, viz., 50 per cent to a lower level (25%) and the remaining quantity could be profitably apportioned at later periods of rice growth in three instalments of 25 per cent each.

Variability analysis of rainfall from 1932-1988 in Tamil Nadu Rice Research Institute, Aduthurai revealed that the varieties, viz., CR 1009, ADT 38, IR 20 and CO 43 could be direct seeded during 33rd standard week (August 13-19) where the dependability of rainfall was high (118%) ensuring better germination and establishment of semi-dry rice.

Application of pressmud at 15 t/ha, 25 kg Zn SO_4/ha and half the gypsum requirement is recommended for amelioration of sodic soil to achieve increased yield of rice.

Azolla filiculoides is more suitable for acid and alkaline soil conditions than *A. pinnata.*

Inoculation of *Azospirillum halopraeferne* (salt tolerant strain) to IR 50 rice increased the grain yield by 34 per cent compared to the uninoculated control in saline soils.

A simple portable manual thrashing aid was developed at Aduthurai with a net cost of Rs. 175 per unit This thrasher gave 7 per cent extra grain recovery thus giving an additional income of Rs. 375/ha.

Rooting studies in rice indicated that drought tolerant types possessed high root length (more than 10 per cent) and suffered least reduction in root dry weight (25%) and root volume (20.9%).

Crop protection

Contribution of each component in IPM in rice pest and disease management was assessed in 100 acre field trials at Coimbatore. Adoption of complete IPM resulted in the highest yield (5187 kg/ha) when compared to farmers method (4298 kg/ha). Time of application of pesticides and fungicides based on ETL and application of nitrogenous fertilizers were the important components of IPM.

Gypsum at 500 kg/ha applied in two spilits either basally and at active tillering phase or twice at tillering phase at 15 days interval effectively reduced sheath rot incidence of rice from 36.0% to 22.3%. The grain yield was 3.7 t/ha as against 2.9 t/ha in untreated control.

Prosopis and *Ipomea* leaf extracts at 10% concentration effectively controlled the sheath rot of rice. The disease incidence ranged from 3.4 to 18.4% as against 18.6% to 57.4% in the control.

The parasite, *platygaster oryzae* released at 10 days after transplanting effectively controlled rice gall midge. The percentage of parasitization was 70.8 as against 25.3 in control plots where no parasite was released.

Setting up of owl perches in the field effectively reduced the rat damage. Rat burrows were completely absent in the fields with owl perches whereas 131 rat burrows were noticed in the field without owl perches.

Experiments were conducted to determine the relative and persistant toxicity of insecticides to spiders with brown planthopper, *Nilaparvata lugens* Stal. under laboratory conditions. The results indicated that phosphamidon, neem oil and neem seed kernel extract were least persistant on wolf spider, *Lycosa psudoannulata* when fed with treated BPH. With regard to web spider, *Tetragnatha javana*, phosphamidon was found to be least toxic to spider through BPH.

MILLETS

SORGHUM

Crop Improvement

Varieties Released

Sorgdum Hybrid CoH 4 : A new high yielding sorghum hybrid x 7555 of the cross 296 x TNS 30 developed at Coimbatore was released as CoH 4 during January 1991. On an average, it recorded a grain yield of 3.7 t/ha with an increase of 24% over CSH 5 and 16% over Co 26. The average fodder yield of this hybrid was 16.1 t/ha which was 10% increase over Co 26. It matures in 105 days and grows to a height of 215 cm. It possesses pearly white grains of medium size with acceptable nutritional qualities. This hybrid is recommended for cultivation during summer season in the districts of Coimbatore, Periyar, Salem, Sambuvarayar, Vellore Ambedkar, Dindugal Quaid-e-Milleth, Madurai, Trichy, VOC and Nellai Kattabomban.

Paiyur 1 : The high yielding sorghum culture SNC 13, a hybrid derivative of the cross combination Co 19 x Co 24 was released as Paiyur 1. This variety is suitable for growing in Thalaivirichan sorghum tract of Dharmapuri, Salem and North Arcot districts under rainfed conditions. It matures in 142 - 150 days and yields 971 kg/ha of grain and 9.35 t/ha of fodder which are 15% and 5% increase over Co 19 respectively. It is endowed with sweet, juicy and thin straw with palatability as cattle feed. The earhead is open (lax panicle) with translucent pearly white grain. It has high level of tolerance to shootfly, stemborer and earhead bug and diseases like downy mildew and leaf spots as compared to Co 19. It is tolerant to drought. It has regeneration capacity associated with deep penetrating roots and good cooking quality with taste and flavour.

K 10 : The high yielding culture KS 7629 was released as K 10 fodder sorghum. It recorded a dry fodder yield of 11.4 t/ha registering 34.2% increase over K 3 and 14% over K. 7. It has given a grain yield of 1680 kg/ha. This variety is resistant to leaf blight, downy mildew, leaf spot and grain mould.

Promising cultures

TNS 32 (SPV 678) : This culture has consistently recorded high yields over other entries tested in advanced yield trials and All India Co-ordinated trials. This culture will be tested again under ART during 1991-92 under rainfed condition.

V. S. 47 : It has recorded an average grain yield of 1944 kg/ha as compared to 1560 kg/ha recorded by Co 19 (check). The yield increase was 24.6 per cent over Co 19. This culture is shorter in duration by 20 days than Co 19. This will be tested in OFT during 1991-92 in North Arcot district.

ICSV 202 : This selection from Bhavanisagar has given 24% higher yield than Co 26. This culture will be tested in OFT during 1991-92 in Periyar and Coimbatore districts.

Crop Management

Economics of integrated moisture and nutrient management studies for rainfed sorghum in alfisol at Coimbatore clearly indicated that flat sowing of sorghum followed by forming furrows during third week with composted coir pith at 12.5 t/ha and recommended level of NPK at 40 : 20 : 0 was beneficial recording the highest net return of Rs. 1998/ha with B/C ratio of 1.52.

Experiments condcted to evaluate seed hardening methods in vertisol showed that the triazole S 3307 (0.002%) as seed soaking for 5-10 hours increased the yield of rainfed crops, viz. sorghum (17.8 t fodder/ha), cotton (1.04 t/ha) and chickpea (0.83 t/ha) when comared to control (sorghum 17.0 t/ha, cotton 0.95 t/ha and Chickpea 0.73 t/ha).

In sorghum, grain yield was pcsitively related to soluble protein content (11.32 mg g^{-1}; r = 0.77**) and leaf area index (8.3; r = 0.58**) during grain filling stage. Dry matter production was significantly related to Nitrate Reductase activity at grain filling stage (r = 0.42**).

For rainfed sorghum + cowpea system, presowing incorporation of isoproturon 0.5 kg/ha gave good control of weeds with high selectivity to both the crops while application of pendimethalin 1.0 kg/ha after first spell of rainfall was efficient for control of weeds with high selectivity to both the crops.

The three major soil series of Madurai district, viz., Irugur, Somayanur and Palaviduthi had exchangable Mg less than the critical limit (2.88 me/100 g of soil) covering 42.51% of the area at Madurai district. Application of $MgSO_4$ at 30 kg/ha in deficient soils was found to be optimum for getting high yields in sorghum.

Crop Protection

The sclerotial stage of sugary disease in sorghum is not produced in Tamil Nadu. The sugary secretions were colonised by the antagonist, *Cerebella andropogonis* which inhibits sclerotial development.

CUMBU

Crop Improvement

Promising Cultures

ABH 219 : This hybrid has recorded an average grain yield of 3716 kg/ha in 100 days with an increase of 11.4% over the standard x 5. It is also resistant to downy mildew.

ICMS 8330 : This culture has recorded high grain yield of 1358 kg/ha which is 15% higher than x 5.

Crop Management

Experiments conducted in rainfed pearlmillet with different moisture conservation techniques during North East monsoon seasons of 1989-90 and 1990-91 revealed that line sowing in flat beds followed by forming furrows in between crop rows during intercultivation (30 DAS) gave a high mean yield of 1072 kg/ha and a net return of Rs. 1500/ha compared to the conventional flat sowing which recorded 629 kg/ha of grain yield and Rs. 367/ha of net return.

A combined spray of zinc sulphate (0.5%), copper sulphate (0.5%) and boric acid (0.2%) at stray flowering and 15 days later increased the grain yield (17.4%) in pearl millet.

MAIZE

Crop Management

Irrigating maize based on 0.75 IW/CPE ratio (7 irrigations) with all furrow method of irrigation recorded high grain yield (4.87 - 5.06 t/ha), net return (Rs. 9485 - 10924) and B/C ratio (2.93-3.07) in both kharif and rabi seasons. Adoption of alternate furrow method was found to be economical without yield loss under limited water supply area with a saving of 175 mm (35%) of irrigation water.

Soaking maize seeds (Cv Co. 1) in Cycocel at 250 ppm for 16 hours increased the mean grain yield by 2.0 q/ha over control (without cycocel treatment). Cycocel beyond 250 ppm reduced the grain yield.

Crop Protection

Seed treatment with metalaxyl (6 g/kg) and one spray with 0.4% metalaxyl + mancozeb 20 DAS reduced downy mildew incidence to 16.6% as against 58% in control. This treatment doubled the yield (4450 kg/ha) when compared to control (2177 kg/ha).

RAGI

Crop Improvement

Promising cultures

TNAU 511: This culture is a hybrid derivative of Indaf 1 x TNAU 303 with a medium duration of 105 days. It was found to be superior over existing variety Co 13. The mean yield is 4102 kg/ha which is 74% higher than check Co. 13. The culture is under ART.

TNAU 332 : It is a cross-derivative of Co 7 x TAH 60/6-4. It matures in 110 days with a mean grain yield of 2735 kg/ha which is 16% increase over check Co 13.

TNAU 334 : It is also a cross-derivative of Co 7 x TAH 60 / 6 - 16. It matures in 100 days with a mean grain yield of 2834 kg/ha which is 20% increased yield over Co 13 (2351 kg/ha).

Crop Management

Experiments were conducted at Paiyur to develop integrated weed management practice for rainfed direct seeded ragi. For post emergence application on the 10th day, either 2.4-D Na salt or 2, 4-D ethylester at 0.5 kg/ha recorded higher yield (1.62-1.64 t/ha) than at 0.75 kg/ha (1.48-1.56 t/ha). For application at 15th day 0.75 kg/ha proved efficient in controlling the weeds and increasing the yield (1.70 t/ha).

MINOR MILLET

VARAGU

Crop Improvement

Variety Released

APK 1 : It is a selection from Pune varagu culture. It matures in 100 days. It is dwarf in stature with a mean grain yield potential of 2400 kg/ha which is 22.5 and 45.9 per cent higher than K 1 and Co 3 respectively. It is a non-lodging type and tolerant to downy mildew, ergot, smut and stem borer. It has high hulling percentage (74%) and contains more protein than K 1 and Co 3.

PULSES

REDGRAM

Crop Improvement

Variety Released

Co 6 : It is an induced mutant from SA 1. It is indeterminate in growth habit with photosensitiveness. Its mean yield potential is 890 kg/ha which is 15.2% more than SA 1. Besides wide adaptability, it has a high field tolerance to drought and pod borer. It has high protein (19.14%) and methionine (1.15%) content.

Promising culture

VR 1 : This culture has a duration of 95-100 days with highest average yield of 940 kg/ha which is 35% and 43% higher than the check varieties ICPL 87 and UPAS 120 respectively.

Crop Management

Field experiments conducted under irrigated condition during kharif 1987-88 and 88-89 with four different population levels to select redgram genotypes for ratooning revealed that among the genotypes studied CORG 5 produced high yield (1450 kg/ha) under both sown as well as ratoon cropping. With regard to population, 80,000 plants/ha adopting 50 x 25 cm spacing was found to be optimum.

Combined inoculation of rhizobium and phosphobacteria along with basal application of 12.5 kg N + 37.5 kg P_2O_5 / ha (Mussouriephos) increased the yield of rainfed redgram by 23% over untreated control.

Crop Protection

Spraying NSKE 5% twice followed by triazophos 0.05% reduced the pod damage by gram pod borer *Heliothis armigera* and plume moth *Exelastis atomesa* significantly to 12.8% when compared to control which recorded 41.9% damage. This treatment gave the highest yield (738 kg/ha) over all other treatments. The untreated control recorded only 296 kg/ha.

BLACKGRAM

Crop Improvement

Promising cultures

COBG 305 (ADT 2 x Ru 2) : This promising culture is capable of giving 601 kg/ha as against 499 kg/ha by Co 5. It is now being tested in ART.

VB 3 : It is an yellow mosaic resistant culture with a yield potential of 700-800 kg/ha. This culture is advanced to ART.

Crop Management

Water stress imposed during different stages of growth of blackgram caused 45.5 and 59.5 per cent reduction in grain yield in genotypes Co 5 and VBN 1 respectively. The reduction in yield was more pronounced due to stress during vegetative stage. Among various ameliorants tested, foliar spray of K in the form of Kcl at 0.5 per cent during flowering phage was found to be very effective and increased the grain yield by 169 kg/ha and 46 kg/ha in Co 5 and VBN 1 respectively.

Crop Protection

The effect of application of organic amendments containing *T.viride* on root rot incidence of blackgram was studied under pot culture condition. The results revealed that paddy husk, neem cake and FYM containing 2.0% *T. viride* was highly effective and reduced the root rot incidence to 3.45%, 4.41% and 5.18% respectively when compared to control which recorded 38.75%.

In another study, seed treatment of blackgram with *Trichoderma* spp was found to significantly reduce the incidence of root rot disease (5.8%) when compared to control (31.06%).

Spraying neem oil (3%) twice resulted in reduced incidence of powdery mildew (15.3%) and yellow mosaic (8.7%) in blackgram besides increasing the yield (267 kg/ha). The untreated check recorded 56.4% powdery mildew and 11.0% yellow mosaic, with grain yield of 146 kg/ha.

GREENGRAM

Crop Improvement

Promising cultures

VGG 4 (ML 65 x LM 2) is a yellow mosaic tolerant variety with a yield potential of 850 kg/ha and it is in ART. Two other cultures VGG 6 and VGG 7 with a duration of 70 days are in MLT.

COGB 2 (IM 66 x Co 3 BC) and G. D. 1-47-4 (KM 2 x V 5200) are also field tolerant to YMV incidence with 3.0 and 4.9 per cent infection respectively as against 29.6 and 13.0 per cent recorded by Co 4 and Co 5.

SOYBEAN

Crop Management

Studies conducted at Madurai revealed that increased plant population of 6.6 lakh plants/ha (30 x 5 cm) with basal application of NPK at 60:120;40 kg/ha in combination with foliar spraying of 2 per cent diammonium phosphate and 0.5 per cent $ZnSo_4$ at flowering stage was the best combination for maximising the soybean production in an economical way.

Studies on agro-climatic parameters and moisture regimes on the productivity of soybean have shown that earlier sowing in kharif (16th June) and delayed sowing in summer (3rd week of February) were the best and recorded grain yields of 3155 and 2941 kg/ha respectively.

Scheduling irrigation at 0.6 IW/CPE throughout the crop period resulted in the highest yield in summer (1422 kg/ha) as well as kharif season (1621 kg/ha).

At Bhavanisagar applying 2.5 cm depth of water for soybean (Co 1) by sprinkler irrigation at 0.5 IW/CPE ratio recorded an average yield of 1583 kg/ha in three seasons with a high water use efficiency of 5.1 kg/ha/mm.

In soybean, the peak flowering (35th day) was identified as the critical growth stage at which potassium supplement was needed. Foliar spray of 1.0% potassium chloride at peak flowering resulted in yield increase by 39% over control. Net profit was Rs. 2400/ha.

COWPEA

Crop Improvement

Promising cultures

VCP 5 : It has a duration of 65 days. This culture recorded an average yield of 750 kg/ha with 15.2% increase over the check Co 4.

VCP 6 : It is a vegetable cowpea culture with yield potential of 3800 kg/ha of green pods and is in MLT during 1990-91.

BENGALGRAM

Crop Protection

Field experiments on chickpea showed that three sprays of NPV @ 250 LE/ha along with 10% aqueous leaf extract of *Vitex negundo* gave maximum grain yield of 758 kg/ha by effectively controlling *Heliothis armigera* larvae. Aqueous leaf extracts of *Prosopis julifera* (10%) in combination with NPV @ 250 LE/ha was also found effective giving a yield of 695 kg/ha. The untreated control gave only 437 kg/ha.

Incidence of root rot of chickpea was significantly reduced by seed pelleting with biocontrol agents *T. hamatum, B. subtilis, P. fluorescence* and *T. viride*. Yield was significantly high in *T. hamatum* seed pelleting followed by *B. subtilis* and *P. fluorescence*.

HORSEGRAM

Crop Improvement

Promising cultures

Two horsegram cultures CODB 2 and CODB 7 are under ART. These two cultures mature in 110 days and record 15-20% increased yield over CO 4.

LAB LAB - AVARAI

Crop Improvement

Variety Released

Co 12 : A high yielding avarai culture CQLT 20, a cross derivative (Co 9 x Co 4) with a duration of 100-110 days has been released as avarai Co 12 during the year for general cultivation. It is a photoinsensitive bushy type with attractive purple colour pods. The seed contains 24.6% protein. The pod is with less fibre, and of better cooking quality. It gives a mean pod yield of 9 7 t/ha and as a grain crop 1384 kg of seed is likely to be obtained from one hectare.

LIMABEAN

Crop Improvement

Variety Released

LBS 1 : It is a new pulse variety released during this year. It matures in 70 days and can be grown all through the year. It is suited for intercropping and bund cropping. Limabean contains 19.8% protein. This variety gives an average grain yield of 1020 kg/ha.

OILSEEDS

GROUNDNUT

Crop Improvement

Promising cultures

TNAU 97 : This is a spanish bunch culture with 90 days maturity period. It recorded an average yield of 2388 kg/ha. This has been passed on to ART.

ICGS 50 : It is an inter-specific derivative of the cross *A. hypogaea* x *A. cardinasii*. It is a semi-spreading type. In ART, it has recorded a mean yield of 1557 kg - 1595 kg/ha which is about 32.0% increase over check TMV 10.

Crop Management

The study conducted at Vridhachalam to prolong the seed viability by improving the storage practices indicated that rabi/summer harvested groundnut could be stored in closed plastic containers or in gunny bags with calcium chloride @ 250 g for 30 kg of pods. The germination was 70% even after eight months of storage.

For groundnut grown under rainfed condition in Dharmapuri district in the Vannapatti soil series (coarse textured, low CEC and high P fixing type), supplementing phosphobacterium (2 kg P_2O_5/ha) proved beneficial by registering 17.8% enhanced pod yield over control (no P_2O_5) during 1989-90 and 32% increased pod yield during 1990-91.

Foliar spray of triacontanol 3 ppm twice (30 and 45 DAS) along with basal application of triacontanol granule @ 10 kg/ha consistently increased the growth parameters and yield of pods in groundnut.

Application of gypsum @ 200 kg/ha at 25th day after sowing and second dose of 200 kg/ha at 45th day increased the yield of groundnut (1062 kg/ha) when compared to conventional method of basal application (939 kg/ha).

At Bhavanisagar, sprinkler method of irrigation was compared with surface method for the groundnut crop variety VRI 2. It was found that application of 3 cm depth of water through sprinkler at 0.6 IW/CPE ratio (ie irrigation once in eight days) gave the highest water use efficiency (6.57 kg/mm/ha) and pod yield of 2103 kg/ha in comparision with surface irrigation which gave 2100 kg/ha with water use efficiency of 6.30 kg/mm/ha.

Crop Protection

One or two application of NPV @ 250 LE/ha along with the adjuvant-jaggery 2.5 kg/ha and Teepol 250 ml/ha are to be given depending upon the incidence of early instars at 10 days interval to reduce the larval population of *Spotoptera litura*.

Among different dust formulations tried at Tindivanam against groundnut leaf miner, quinalphos 1.5% D (25 kg/ha) significantly controlled the leaf miner larvae and recorded low leaflet damage, followed by fenval 0.4% D (31.25 kg/ha).

SESAMUM

Crop Improvement

Promising cultures

Three sesamum cultures viz., TNAU 63, TNAU 64 and TNAU 65 were found to be promising. These cultures have recorded 1324, 1350 and 1426 kg/ha respectively accounting for 16.4, 18.3 and 25.4% increase in yield over Co 1. These cultures are in ART.

Crop Management

Technology package for sesamum

Among the sesamum varieties evaluated for summer irrigated sowing in Cauvery Delta Zone in the cropping system of Rice-Rice-Sesamum, the variety TMV 6 had recorded 65% increased yield (903 kg/ha) over local (587 kg/ha).

Thinning and gap filling on 14th day to maintain 11 plants/m^2 resulted in 19 per cent increased yield (1108 kg/ha) over farmers method (923 kg/ha).

Wet seed treatment with carbendazim+spraying of carbendazim on 35th day to control the diseases gave 31.6% increased yield (857 kg/ha) over control (651 kg/ha).

Application of Alachlor through sand mix on 20th day of crop growth along with irrigation water controlled *Trianthema* weed very effectively. The per cent of weed control was 97% with sesame yield of 1250 kg/ha. The control recorded only 937 kg/ha.

Recommended technologies to sesame (seed treatment with carbendazim, Mn SO_4 application, seed and soil application of Azospirillum, recommended fertilizers, optimum plant population, proper plant protection) increased the yield significantly (980 kg/ha) accounting for 63% over farmers method.

Crop Protection

Treating the sesamum seeds either with endosulfan 4D or Ekalux 5D @ 1% protected the seeds from the attack of red flour beetle *Tribolium castaneum* and recorded only 0.8% weight loss upto 4 months.

Two rounds of spray of neem oil 2% resulted in the highest control of leaf damage (83.1%) by shoot webber and pod borer. Neem oil spray was on par with endosulfan 0.07% spray (87.9%).

In the control of *Alternaria* leaf spot 2 sprays of mancozeb (0.2%) applied at 15 days interval from the initial appearance of the disease was found to be optimum.

SUNFLOWER

Crop Improvement

Promising cultures

Culture TNAU SUF 6, TNAU SUF 7 and TNAU SUF 9 were found to be promising in Southern Zone. These cultures recorded a mean yield of 625, 601 and 661 kg/ha as against 546 recorded by K 1, the best check.

Crop Management

Among the different invigouration treatments, soaking of 5 months old seeds in double the volume of disodium phosphate solution at 10^{-4} concentration recorded high germination, vigour and storage life.

Studies on the identificarion of suitable intercrop to sunflower revealed that, raising bengalgram as an associate crop with sunflower was found to be superior in registering high LER (1.07) and monetary return ha^{-1} (Rs. 8649) as compared to the other associate crops like cumbu, tenai, panivaragu, gingelly and mustard.

Endosulfan 0.05% and phosalone 0.05% controlled the sunflower leaf hoppers effectively.

The sap of *Crotolaria juncea* possesses high inhibitory effect against TSWV even at a dilution of 1/30 and even after heating to 70°C. The inhibitory principle was found to be a protein.

CASTOR

Crop Improvement

Promising cultures

TVC 11 and TVC 15 : These two cross derivatives have recorded a mean increased yield of 20-25% over local checks under both rainfed and irrigated conditions. They have a duration of 150 days and currently they are in ART.

Crop Protection

Neem seed kernel extract 3% was found to be effective as endosulfan in controlling leaf hopper. The combination of NSKE 3% with neem oil 3% recorded the highest control of castor semi looper at Tindivanam.

COCONUT

Crop Management

The Erode monthan banana was found to be a remunerative intercrop in coconut gardens. During the years 1987-88 to 1989-90, an additional income of Rs. 4300, Rs. 3000 and Rs. 2700/ha respectively was obtained from the intercrop (400 plants/ha) at Veppankulam.

Six rounds of feeding at the rate of 100 ml of 2000 ppm ferrous sulphate (2 g/1000 ml of water), given at six monthly intervals enhanced the nut yield from 20 to 30 nuts/plam/year. The number of functional leaves increased from 10 to 25. The girth at collar region has also considerably improved by the above treatment.

Crop Protection

Two rounds of application of nephthalene balls @ 3 per/tree effectively reduced the damage of rhinoceros beetle in coconut.

Either spraying with monocrotophos 0.036% with high volume sprayer or soil application with phorate 10 G at 40 g/palm was found effective in controlling the coconut scale *Aspidiotus destructor* and phorate 10% at 25 g/seedling against the mealy bug, *Pseudococcus longispinus.*

Application of neem oil 3% was found equal in efficacy as that of the spray with lebycid 0.1% in controlling the mealy bug on coconut.

Spraying Bordeaux mixture (1%) or ridomil MZ (0.1%) or neem oil 1% can be recommended for the trees showing initial symptoms of bud rot incidence.

Application of neem cake (5 kg/tree) + *Trichoderma harzianum* (500 g inoculum in 50 kg of FYM) recorded lowest wilt disease index and high nut yield.

COTTON

Crop Improvement

Varieties Released

SVPR 1 : The cotton culture TSH 164 developed at Cotton Research Station, Srivilliputhur was released as new cotton variety SVPR 1. This has a duration of 135 days. It is suitable for summer irrigated and tankfed rice fallow tracts of Tamil Nadu. It has recorded an average yield of 1540 kg/ha as compared to 1140 kg/ha in MCU 7 accounting for an increase of 34.9%.

Paiyur 1 : It is a hybrid derivative of MCU 10 x SRT 1 evolved from Regional Research Station, Paiyur. It has recorded a mean kapas yield of 960 kg/ha under rainfed condition with an increase of 10% over LRA 5166 and 10% over MCU 10. It has a duration of 140-145 days which is 7-10 days earlier over the checks. It also possesses drought tolerance, and resistance to bacterial blight and alternaria leaf spot diseases.

Crop Management

Yield maximisation experiment conducted during winter season of 1988-89 with MCU 9 cotton at Coimbatore revealed that the integrated production technologies like high plant density (1.0 lakh plants/ha), canopy management with cycocel (foliar spray 75 ppm on 65th day), high dose of NPK (160:80:80 kg/ha), seed treatment with cycocel (1000 ppm) and split application (4 splits viz. 20, 40, 60 and 80 DAS) of neem cake blended urea were found to be effective production techniques with high yield potential of 30.3q/ha seed cotton compared to 20.3 q/ha for the conventional method of cotton cultivation. The improved production technology gave a net return of Rs. 19675/ha with B-C ratio of 4.24 as against Rs. 12165/ha with B-C ratio of 3.39 under conventional method of cultivation.

In an antitranspirant trial it was found that Kaolin 3% apray and liquid parafin 1% spray recorded 27.4% (2127 kg/ha) and 19.5% (1995 kg/ha) increased yield over the control (1690 kg/ha) respectively under summer irrigated condition in MCU 7 cotton at Srivilliputhur.

Blackgram genotypes KBG 51 and KBG 512 were found to be suitable for intercropping in cotton at Kovilpatti in terms of monetary return and LER.

Crop Protection

Studies on the control of cotton surface weevil have revealed that seed treatment with either Aldrin or Chlorpyriphos 50 ml/kg of seed recorded only 8% damaged plants and 9% damaged leaves in both the treatments, while untreated plants showed 45.5 per cent damaged plants and 41.4% damaged leaves.

Pre-monsoon sowing during fourth week of September registered significantly lower bollworm damage both in bolls (14.94%) and in seed cotton (4.45%) besides increased yield of kapas (1453 kg/ha).

JUTE

Crop Management

Studies conducted sofar have shown that jute can be successfully grown in Coimbatore, South Arcot, Thiruvannamalai Sambuvarayar, Vellore - Ambedkar, Chengai-Anna and parts of Thanjavur, Trichy, Pudukottai, Nellaikattaboman and Chidambaranar districts where assured supply of irrigation water is available for its cultivation and retting for fibre extraction.

Alluvial sandy loam and clay loamy soils are best suited for jute production. Capsularis jute can grow even in standing water especialiy towards the latter part of its growth, but olitorius jute will not thrive in standing water. The latter is highly drought resistant. It should be grown on lighter soils.

February-May is the best season for jute. The soil should be prepared to a fine tilth since the seeds are very small. Five tonnes of well decomposed farm yard manure are to be applied during last ploughing. In addition 20:20:20 kg/ha of NPK should also be applied basally. Beds and channels are to be formed depending on water resources. The seeds can be sown either by broadcasting or line sowing. A seed rate of 5 kg/ha for line sowing and 7 kg/ha for broadcasting may be adopted in the case of *olitorius* jute. A population of 80 plants/sq.m. is to be maintained (25 cm x 5 cm). In the case of *capsularis* jute 7 kg/ha for line sowing and 10 kg/ha for broadcasting will be sufficient. A population of 67 plants / sq.m. (30 cm x 5 cm) is recommended for good yield.

The crop has a duration of 120-140 days. The recommended varieties are JRC 212, JRC 321, and JRC 7447 for *capsularis jute* and JRO 524, JRO 878 and JRO 7835 for *olitorius jute*.

SUGARCANE

Crop Improvement

Varieties Released

CoC 91061 : This variety is superior to CoC 671 in cane yield, besides possessing resistance to red rot. In the plant crop it has recorded higher cane and sugar yields compared to the ruling early variety CoC 671 by 11.6% and 11.5% respectively. In the ratoon crop also, it has recorded 14.9% and 17.9% higher cane and sugar yields over CoC 671. It has a crop duration of 300-330 days and cane yield potential of 131.0 t/ha and sugar yield potential of 15.6 t/ha.

Promising cultures

In the early season clones C 86018 and C 86033 recorded high yields of 156 and 150 t/ha respectively. The clones C 86001 recorded maximum yield of

146.0 and 141.0 t/ha of cane yield for mid-season with an increase of 10.2% over the Co 6304 which recorded only 132 t/ha.

In the study of performances of clones under saline conditions, clones C 86247 and C 86250 recorded the highest cane yield 115.0 t/ha and 114.3 t/ha respectively.

Crop Management

A study on intercropping in sugarcane with blackgram and soybean was carried out and the results indicated that the mean cane yield under the intercropped conditions was almost the same as the yield of sole crop of sugarcane (107.25 t/ha). The mean intercrop yield was 1075 kg/ha for black gram and 1637 kg/ha for soybean. Growing either black gram or soybean as intercrop in a single row on the ridges between sugarcane rows is recommended, as it fetches an additional income to the farmers, without affecting the sugarcane yield.

A method has been developed at the Sugarcane Research Station, Cuddalore, to prepare reinforced compost from sugarcane trash and pressmud under aerobic conditions. The manurial value of the trash compost prepared by this method had a higher content of nitrogen, phosphorus and calcium than that of the raw material used. The C : N ratio in the compost was brought down by 10 times, as compared to that of cane trash.

Study on the effect of herbicides on the control of *striga* indicated that post-emergence spray of ammonium sulphate at 10% concentration on 45, 75 and 105 DAS recorded a cane yield increase of 16.2 t ha^{-1} over the unweeded check which has fetched an income of Rs. 4000 per hectare. Besides, the same treatment reduced the *striga* population from 10.0 to 1.6 m^{-2}. The Striga growth was controlled upto 190 days.

Crop Protection

Application of monocrotophos 36 WSC @ 1.0 l/ha or malathion 50 EC @ 1.0 l/ha or endosulfan 35 EC @ 1.5 l/ha or detrashing on 5th and 7th month followed by dusting BHC 10% dust @ 37.5 kg/ha was found to be effective in the control of leaf hopper (*Pyrilla perpusilla wlk*) in sugarcane.

Spraying of wettable sulphur @ 2 g/l recorded cent per cent control of web spinning mite which was significantly superior to ethion and phosalone recording 90.0% and 75.0% reduction respectively.

Treating setts in a mixture of carbendazim 0.5 g, urea 10 g, malathion 2 ml and lime 10 g per litre of water was found to be superior to the present standard treatment (Carbendazim 0.5 g + urea 10 g/litre) in controlling the sett rot and enhancing germination. In this treatment, more than 70% germination was recorded in the second week, which rose to 90% in the third week after planting.

A study to control sugarcane smut in relation to time and soil moisture revealed that maintaining the field under dry conditions for fifteen days prior to planting and dipping of setts in carbendazim 0.05% solution for 5 minutes before planting are very effective and reduced the disease incidence in the range of 40-70%.

TOBACCO

Crop Management

Tobacco based high intensity cropping system for LBP area indicated that onion and coriander (green) were the most suitable intercrops in tobacco by giving a yield of 2037 kg/ha and 648 kg/ha respectively without affecting the yield of main crop.

FORAGE CROPS

Crop Improvement

Varieties Released

Co 2 : It is an interspecific hybrid between cumbu and napier grass. It is a high yielding, highly nutritious and palatable perennial fodder grass suitable for irrigated conditions. Under favourable conditions, it has a yield potential of 385 t/ha/yr representing 31 per cent increase over Co 1, the presently popular fodder grass. It is tall growing (195-203 cm), profusely tillering (25/clump), late flowering and more leafy (310 leaves per clump). Its dry matter and crude protein yield potential is 50.3 and 4.9 t/ha/yr respectively. It has low oxalic acid (2.83%) and is relished much by cattle. The palatability is 97%. It is free from the attack of pests and diseases. It is vegetatively propagated through stem cuttings.

Muyalmasal (*Stylosanthes scabra*) : It is a high yielding, drought resistant perennial fodder legume suitable for cultivation as a dryland pure crop as well as a mixture crop with rainfed grass. As a pure crop, it gives a green fodder yield of 32 t/ha/yr in five cuts and as a mixed crop with Co 1 Blou-Buffel grass in 1:3 ratio it gives 39.3 t/ha/yr (8.3 + 31.0). It is free from toxicity and is a protein rich diet to cattle. It has 33.1% dry matter and 16.9% crude protein.

Crop Management

At Paiyur, the results of field trials revealed that in between coconut trees *Desmodium* and *Desmanthus* could be successfully grown, with a mean green fodder yield of 72.0 and 65.4 t/ha respectively.

Harvesting the fodder crops like sorghum, maize and cowpea at 100 per cent flowering stage and drying under complete shade resulted in high yield and good quality fodder with high crude protein content.

BIOTECHNOLOGY

RICE

Eight *indica* rice varieties were tested for callus induction frequency in 10 combinations of MS media supplemented with five levels of 2, 4-D and kinetin each. Among the genotypes tried, cultivars Co 45 and IR 50 have recorded a high callus induction frequency (98 and 97%) in MS + 2, 4-D (2.5 mg l^{-1}) + Kn (0.5 mg l^{-1}) and MS + 2, 4-D (2.0 mg l^{-1}) + Kn (0.5 mg l^{-1}) respectively. The cultivar TKM 9 showed the lowest frequency (40 %). But its response was high (65%) in MS + 2, 4-D (2.5 mg l^{-1}) + Kn (2.0 mg l^{-1}). These studies indicate differential response of the genotypes for callus induction with different media combinations.

PEARL MILLET

In pearl millet, different explants, viz., young inflorescence, leaf, immature embryo and anthers of 14 genotypes were cultured. Culture media for callus induction, callus multiplication, embryoid differentiation and regeneration have been standardised.

FINGER MILLET

For screening salt tolerance, NaCl was added to callus induction medium and callus induction was observed upto a level of 1.2% NaCl. But beyond the level of 0.6% NaCl the callus induction was delayed (upto 7 days) and proliferation of callus was also very slow. The white callus turned brown after 15 days of callus induction and addition of charcoal (0.5%) prevented the browning. Among the other explants like leaf bits, stem bits and inflorescence, inflorescence responded well for callus induction and callus proliferation. Shoot primordia initiation occurred after 30-40 days of sub-culturing in the regeneration medium.

GROUNDNUT

Interspecific crosses were made using 10 genotypes, viz., TMV 10, VRI 1, VRI 2, ALR 1, ALR 2, VRI 3, TMV 2, M 13, TMV 4 and Co 2 of *Arachis hypogaea* with irradiated pollen of *Arachis pusilla* at 0.5 krad gamma radiation. Pegs/ embryos rescued at different days of maturity were cultured on MS, B5, N6 and Whites media with different levels of auxins and cytokinins. Five days and 10 days old pegs formed green calli in which rhizogenesis alone was observed. Callusing was observed in 15 days old pegs at the cut end.

SESAME

Five parental lines and 3 hybrids viz., Co 1, Paiyur 1, Co 2, TMV 4, HD 38 x TMV 6, Si 2814 x Co 1, HD 1415 x TMV 6 were used for anther culture. The anthers at uninucleate stage were cultured for callus induction. Callus initiation occurred on MS medium with high concentration of 2,4-D (25 mg/l) in 25-30 days in different genotypes. First formed callus was light brown and transluscent. It turned embryogenic on regeneration medium, MS + BAP (1 mg/l) + serine (50mg/l). Addition of glutamine and serine at a concentration of 50 mg/l each enhanced good greening of the calli. These embryoids developed roots with root hair like structures on further subcultures.

REDGRAM

Three varieties (Co 3, Co 5 and CORG 5) of redgram were tried for callus induction from leaf explants and embryos. Out of these three, both the explants of Co 4 responded well for callus induction. Seven different media combinations were tried for callus induction. Among them, MS + BAP (1.1 mg/l) + CH (200 mg/l) + sucrose (2%) + Sorbitol (1%) was found to be good for embryo culture and MS + BAP (2.0 mg/l) + IAA (0.5 mg/l) + sucrose (3%) was found suited for leaf explants.

BREEDER SEED PRODUCTION

The breeder seed production programme has been formulated based on the consolidated indent received from the Director of Agriculture, which includes the breeder seed requirement of corporate bodies and seedmen. The details of breeder seed production and supply during the year 1990-91 and the programme for the year 1991-92 are furnished below :

Sl. No.	Crop	Breeder seeds supplied during 1990-91 (Qtls)	Programme for 1991-92 (Qtls)
1.	Rice	202.00	336.40
2.	Millets	1.32	8.83
3.	Pulses	69.87	283.26
4.	Oilseeds	228.21	1000.00
5.	Vegetables	1.57	3.67
6.	Cotton	—	82.32
		502.97	1714.48

HORTICULTURE

POMOLOGY

MANGO

Crop protection

In mango, the treatment involving methyl demeton 0.05% as first spray followed by fenthion 0.1% and carbaryl 0.15% as second and third sprays at 15 days interval was found effective in reducing the nut weevil damage.

BANANA

Crop Improvement

Promising cultures

Hybrid 109 (matti x Tongat) : It is resistant to nematodes and Sigatoka disease. The fruit configuration and taste of this hybrid are just similar to matti which is suceptible to nematodes. The mean bunch weight of this hybrid is 17.5 kg with 13.0 hands containing 324 fruits. It has vertical bunch hang unlike matti which has oblique bunch hang. This hybrid is being tested in Kanyakumari district to replace Matti banana.

Crop Management

For the ratoon crop of Robusta banana, application of 100% recommended dose of fertilizer s) 110 : 35 : 30 g NPK/plant/year) gave the highest yield of 27.3 kg with 11.6 hands and 164.4 fingers / bunch. The cost / benefit ratio was 1.0 : 3.6.

Robusta banana intercropped with lab lab recorded the highest yield of 20.02 kg / bunch with highest number of hands (8.8) and fingers (135.9). The highest net income with the intercrop was Rs. 55,607 / ha whereas in the control, it was only Rs. 35,628 / ha.

Plant Protection

Carbendazim 0.1% spray effectively controls sigatoka leaf spot disease intensity and increases the bunch weight. The cost benefit ratio was 1.0 : 2.5.

Preplant treatment of paring and dipping the suckers in 0.75% monocrotophos for 15 minutes and shade drying for 72 hours coupled with growing sunhemp at 45th day as intercrop effectively checked nematode population in banana.

CITRUS

Crop Management

Rough lemon can be recommended as an ideal root stock for yield and vigour for acid lime.

In acid lime, a fertilizer dose of 600 : 20 : 300 g of NPK per tree per year with nitrogen in two equal splits during March and October and P & K during October was ideal for getting high returns.

In sathugudi orange, the interveinal chlorosis can be corrected by foliar application of 0.05% Mn SO_4 + 0.5% Zn SO_4 + 0.1% urea thrice at an interval of 20 days.

In citrus, the little leaf with interveinal chlorosis was corrected effectively by foliar application of 0.5% Zn SO_4 + 0.1% urea thrice at an interval of 20 days.

Application of *Glomus mossae* on acid lime (10 g/pot or 500 g/field nursery) produced vigorous seedlings.

GRAPES

Crop Improvement

Promising culture

In muscat grapes, a promising culture with longer bunch, high TSS (18.2) and yield has been identified from the gamma irradiated M1 population which is under further evaluation.

Crop Management

Application of 300 g of N + 200 g *Azospirillum* per vine gave the highest mean bunch yield of 70 kg/vine.

Crop protection

In grapes, application of 20 g of phorate/vine after pruning controlled root knot nematode.

PAPAYA

Crop Improvement

Promising culture

CP75: It is a promising pre-release culture. It is gynodioecious with red flesh and has T. S. S. of 13.6° Brix. It has practically no papain odour. It has low bearing heignt (32 cm) as compared to Co 3 (90 cm). Number of fruits and yield / tree are higher than Co 3.

Crop Management

In Co 6 papaya, a closer spacing of 1.4 m x 1.4 m (5102 plants/ha) recorded the highest plot yield of 1503.3 kg / 96.25 sq. m. as against the recommended

spacing of 1.8 m x 1.8 m (3081 plants/ha) which gave 1316.90 kg/96.25 sq.metrs. The papain yield was also high at 7.56 g/fruit in the 1.8 m x 1.8 m. spacing when compared to control (6.71 g/fruit).

Crop protection

Ridomol 0.2% drenching @ 3.4 litres/tree one at the initial appearance of the disease and the second after 15 days effectively controlled root rot of papaya. The next best was bordeaux mixture 1% drenching.

Application of carbofuran @ 1 g a. i / tree before flowering of papaya controlled the nematode population *Potylenchus reniformis and Meloidogyne* sp. upto 86%.

SAPOTA

Crop Improvement

Promising cultures

The sapota hybrid Guthi x Kirthibarthi (2/4) registered high yield of 2251 fruits weighing 103.49 kg/tree.

Crop Management

In sapota, the soft wood grafting can be used as effective method of propagation along with the approach grafting method.

Seeds soaked in 1% KNO_3 or cow dung solution resulted in ideal seed germination and vigorous seedlings.

BER

Crop Improvement

In a seven season evaluation, the ber variety "*Kaithali*" consistently yielded higher than other varieties with a mean yield of 42.5 kg/tree followed by Umran (27 kg/tree).

Crop Protection

Spraying carbendazim 0.1% thrice at 15 days interval reduced the incidence of black leaf spot disease caused by *Prathigada sizyphi* and increased fruit yield in ber.

OLERICULTURE

TOMATO

Crop Improvement

Promising cultures

LE 812 : It has been developed by recurrent selection. It has recorded a yield of 55 to 60 t/ha with a fruit weight of 80-85 g. The fruits are attractive with crimson red flesh. The culture was under further evaluation.

Crop Management

At Coimbatore, the studies on weed control in tomato showed that preplant-application of Goal @ 0.15 kg/ha and hand weeding on 45th day of planting were effective in controlling the weed.

At Pottaneri application of 60:60:30 kg NPK / ha recorded the highest yield of 14.4 t in rainfed tomato.

BRINJAL

Crop Improvement

Promising cultures

EP 89 : This high yielding culture suitable for ratooning has been identified from Palur. It is a mutant from Annamalai brinjal with cluster bearing habit. The fruits are short and oblong.

Crop Management

At Coimbatore, analysis of three year data revealed that a combination of 150:30:30 kg NPK / ha with a spacing of 75 x 50 cm was optimum giving high yield of 36.9t/ha in Co 2 brinjal.

CHILLIES

Crop Improvement

Variety Released

Co 3: It is a dwarf and compact variety and suitable for high density planting. It has recorded a yield of 3.5 t/ha of dry chilli under close planting of 30 cm x 15 cm. Besides high yield, it has superior quality characteristics such as low stalk / pod ratio (6.2), high capsaicin (0.402%) and oleoresin content in pods (13.6%).

Promising culture

At Agricultural Research Station, Paramakudi, from the segregating progenies of Gundu chillies (Co 2 x local), hybrid derivative D-1-2-1 was found to be drought tolerant, dwarf in stature and had a yield potential of 2.5 t/ha of dry pods under semi-dry conditions. This culture was proposed to ART.

BHENDI

Crop Improvement

Variety Released

Co 3 : It is a hybrid between Parbhani Kranti (PB 57) and MDU 1. It has field tolerance to yellow mosaic disease and capable of giving a mean yield of 16 - 18 t/ha which is 46.7% more than Pusa Sawani and 21.6% more than Co 2. The disease incidence even during the summer did not exceed 10 per cent. It is suited to both kharif and rabi seasons. It has green colour fruits.

Promising culture

At Agrl. College and Res. Institute, Madurai, a hybrid derivative of AE 974 x Pusa Sawani with potential yield of 16.5 t/ha has been identified.

BUTTER BEANS

Crop Improvement

Variety Released

KKL 1 : This variety has a yield potential of 3.5 t/ha (beans) with bold, globular, snow white beans with a duration of 100 - 140 days. It is a pole type and grows to a height of 2.42 meters. In higher elevations (more than 1800 - 2200 MSL) it is suited for August - February season.

ONION

Crop Management

At Bhavanisagar, the influence of various irrigation schedules and N levels on growth and yield of onion was studied. It was found that onion (Co 4) requires irrigation at 1.2 IW/CPE ratio and application of N at 90 kg/ha for getting high yield.

GARLIC

Crop Improvement

Variety Released

Ooty 1 : It is shorter in duration having long sized bulbs (30 - 40 g) and high yield (17.0 t/ha). This variety is resistant to thrips and tip drying caused by

foliage nematode. It is moderately resistant to blast and suitable for growing in South Indian hills above 2000 MSL.

TAPIOCA

Crop Improvement

Promising culture

At Coimbatore, two short duration varieties of cassava (with seven months duration) viz., H. 119 and S. 856 have been identified. The entry H. 119 recorded a mean yield of 36.4 t/ha followed by S. 856 with 32.0 t/ha over three seasons trials.

Crop Management

At Coimbatore, the fertilizer response of the short duration types was studied. A lower fertilizer schedule of 50 : 50 : 25 kg NPK/ha with a closer spacing of 75 cm x 75 cm recorded 23.8 t/ha of tuber yield.

DIOSCOREA

Crop Improvement

Variety Released

Co 1 : It is capable of yielding 45 t/ha in a crop duration of 8.0 - 8.5 months. The tuber contains 28.1% starch and 2.5% protein. The tubers are big in size with white flesh. It is suitable for growing throughout the year.

COLACASIA

Crop Improvement

Variety Released

Co 1 : It is a local introduction. It yields 22.9 t of tuber/ha. The tubers have a starch content of 22.5% and 2.4% protein. The tubers possess good cooking quality and less acidity. It has a crop duration of 200 - 210 days.

COLEUS

Crop Improvement

Co 1 : It is a selection from Tenkasi type. It records a mean yield of 31.9 t/ha and starch content of 21.5%. It has a crop duration of 180-190 days.

FLORICULTURE

ROSE

Crop Management

In Edward Rose, nitrogen application at 37.5 kg/ha, inoculation of azospirillum @ 2 kg/ha on 6th month and ascorbic acid spray at 1000 ppm after 30 DAP were found to increase the flower yield (5331.3 kg/ha). Pedical length, flower weight and flower diameter were also high in this treatment.

JASMINE

Crop Improvement

Variety Released

Co 2 : It is an induced mutant from Co 1, with bolder pink buds. It is capable of yielding 3.64 kg of flowers/year/plant (11.7 t/ha) which is 19.5% more than Co 1. This variety is suitable for all districts of Tamil Nadu.

CHRYSANTHEMUM

Crop Improvement

Promising culture

AC No. 89 : This culture registers high yield. The flowers are dark pink with yellow disc, semi double and 5.2 cm in diameter.

Crop Management

Salt tolerance studies with three commercial varieties (Co 1, Megani and MDU 1) indicated that MDU 1 has comparitively high tolerance to soil and water salinity.

In vitro screening of these three varieties revealed that presence of high levels of salt (0.25 - 1.0%) NaCl + $CaCl_2$ in the M.S. medium inhibited the callus initiation.

SPICES AND PLANTATION CROPS

COFFEE

Crop Management

At Horticultural Research Station, Yercaud application of N fertilizer @ 120 kg/ha as neem cake blended urea in two splits (March and August) was found to

increase the yield of coffee when compared to application of 160 kg/ha of urea in 4 split doses.

Application of 120 kg P_2O_5/ha in the form of Mussoriephos was found to be superior to superphosphate application in increasing the yield.

TURMERIC

Crop Improvement

Promising culture

TC 2 : It is a mutant from Erode local. It has registered the maximum yield of 37.5 t/ha with 19.2% curing capacity and 4.48% curcumin content.

Crop Management

Field experiment conducted with BSR 1 at Bhavanisagar on the application of Fe and Zn indicated that application of Zn SO_4 @ 25 kg ha recorded an increased yield of 7.1%.

CORIANDER

Crop Improvement

Variety Released

Co 3 : It is a reselection from Accession No. 695 from IARI, New Delhi. It yields 640 kg/ha which is 15% more than Co 1. This variety is suitable for both kharif and rabi seasons. It is tolerant to wilt, grain mould and drought The seeds are medium sized with attractive brownish yellow colour with oil content ranging between 0.38 - 0.41%.

CASHEW

Crop Improvement

Variety Released

VRI 3 : It is a high yielding variety with high nut weight and shelling percentage. This variety is capable of yielding 2680 kg/ha. Nuts are large in size with 3.6 cm length and 2.7 cm width and possess high recovery of kernel. This can be grown in all soil types from the sandy sea coast to laterite hill slopes.

Crop Management

The soft wood grafting technique was standardised with 51 - 60% success.

The cumulative mean yield of 5 years in different methods of fertilizer application showed that application of NPK @ 500 : 200 : 300 g/tree in an area of 1.5 m width between 1.5 m and 3.0 m from the base of the trunk recorded the highest yield of 5.2 kg raw nuts/tree whereas it was only 3.1 kg/tree in trench method of application.

FOOD SCIENCE AND NUTRITION

Conservation of energy at households through the use of solar cookers

An attempt was made to supplement the use of solar cooker in regular cooking in middle class households in order to conserve energy. The study revealed that if each household used the solar cooker as a supplementary energy saver, it would result in a saving of 26% in the expenditure towards indane gas.

Effect of temperature on specific proven microbial strains in idli batter fermentation

Idli batter fermentation was carried out at 28°C, 35°C and 42°C by inoculating specific proven microbial strains, viz., *Torulopsis holmii* MAB 3, *Leuconostoc mesenteroides* MSC 1 and *Lactobacillus casei* NCIM 2125. Among the three levels of temperatures, the temperature of 28 C was found to be highly optimum for the microbial strains to effectively carry out the fermentation of idli batter. The increase in batter volume (45 ml), decrease in batter pH (0.2) and increase in total acidity (0.04 g lactic acid/g. dry blend) were found to be maximum at 28°C. At 28°C, these microbial strains inoculated together actively improved the fermentation efficiency and the nutritional contens, viz., free sugars (3.6 g/100 g), thiamine (0.60 mg/100 g), riboflavin (0.66 mg/100 g), lysine (4.8 mg/100 g), arginine (6.7 mg/100 g), tryptophan (2.5 mg/100 g) and methionine (2.0 mg/100 g). Among the individual microbial strains used *L. casei* NCIM 2125 produced more amount of riboflavin (0.64 mg/100 g) followed by thiamine (0.58 mg/100 g).

Improving the contents of vitamins and amino acids in the fermented milk inoculated with specific proven microbial strains

The boiled and cooled milk was fermented by using specific proven microbial strains, viz., *Streptococcus lactis* C. H. 3, *Streptococcus thermophilus* A. B. 6, *Lactobacillus citrovorum* P. H. 17 and *Lactobacillus casei* NCIM 2125. The fermented milk obtained contained the maximum quantity of the vitamins, viz. thiamine (0.07 mg/100 g) and riboflavin (0.19 mg/100 g). Likewise the fermented milk contained more amino acids, viz., arginine (0.19 g/g. N), lysine (0.40 g/g. N), phenyl alanine (0.27 g/g. N), tyrosine (0.29 g/g. N), methionine (0.14 g/g. N), valine (0.42 g/g. N), threonine (0.34 g/g. N), leucine (0.62 g/g. N), isoleucine (0.31 g/g. N) and total N content (0.52 g/100 g).

FORESTRY

TREE IMPROVEMENT

An evaluation of eight provenances of *A. tortilis*, five of them originating from Sudan revealed seedlot No. 1159/83 to reign supreme in tree height and stem diameter four years after planting.

Thirty five species of *Casusrina* received from the CSIRO, Australia were planted in March 1988 at the Forestry Research Station, Mettupalayam. Among these, barring six, the rest failed to acclamatise to the new habitat and withered away. Among the surviving, *Allocasuarina littoralis* and *A. corniculata* recorded maximum height and diameter growth 32 months after planting.

AGROFORESTRY

A comparison of 13 tree species for their efficacy in nutrient return through litterfall revealed *Acacia mellifera* and *Casuarina equisetifolia* to subscribe the highest amount of nitrogen (23.5 kg ha^{-1}). Recycling of phosphorus and potassium was maximum in *Leucaena leucocephala* and *Prosopis juliflora* respectively.

Seven crops which included six field crops (sorghum, field beans, cowpea, sesame, sunflower and cotton) and a fodder grass (BN 2) were raised every year for three consecutive years in the interspaces of silk cotton saplings planted with a spacing of 8 m x 8 m. No crop yield impairment due to proximity of the trees was evident. Semi-annual growth rate of tree was also not affected during the first six months due to intercropping. During the next six months however the fodder grass completely inhibited the sapling growth. Crops barring BN. 2 grass can be grown upto 3 years in conjunction with silk cotton tree.

SILVICULTURE

For many tropical trees few guidelines on optimum time of seed/fruit collection are available. This was investigated in *Ailanthus excelsa* by periodical monitoring of fruit characters from anthesis to maturity. Physiological maturity of seeds as measured by both maximum fruit weight and peak germinability was attained 20 days after anthesis. Fruits at this maturity level also produced seedlings characterised by maximum size, dry matter production and vigour index. Physiological maturity was indicated by a distinct colour change of the fruit from yellowish brown to brown. This morphological feature may be used as a reliable occular indicator of fruit maturity in the species.

Seed of *C. equisetifolia* were resolved into four density classes by feeding in a South Dakota blower and regulating valve openings at 10, 15 and 20°.

Air blown seeds at 20° proved to be the dominant class accounting for 39% of the total seed lot. Compared to ungraded seedlot only seeds retained at 20° possessed ideal seed weight, germination and vigour index.

AGRICULTURAL ENGINEERING

A biomass gas stove of 4.4 KW capacity has been developed to work with any type of biomass. The consumption rate of biomass preferably in the form of chips and splinters varies from 3.5 to 4.5 kg h^{-1}. Thermal efficiency of 23 - 25% has been obtained with Acacia sp, Casuarina, subabul, maize cob and cotton stalk. The flame temperature ranged from 980 to 1150°C. It was found to be more useful for jaggery making, cocoon cooking etc.

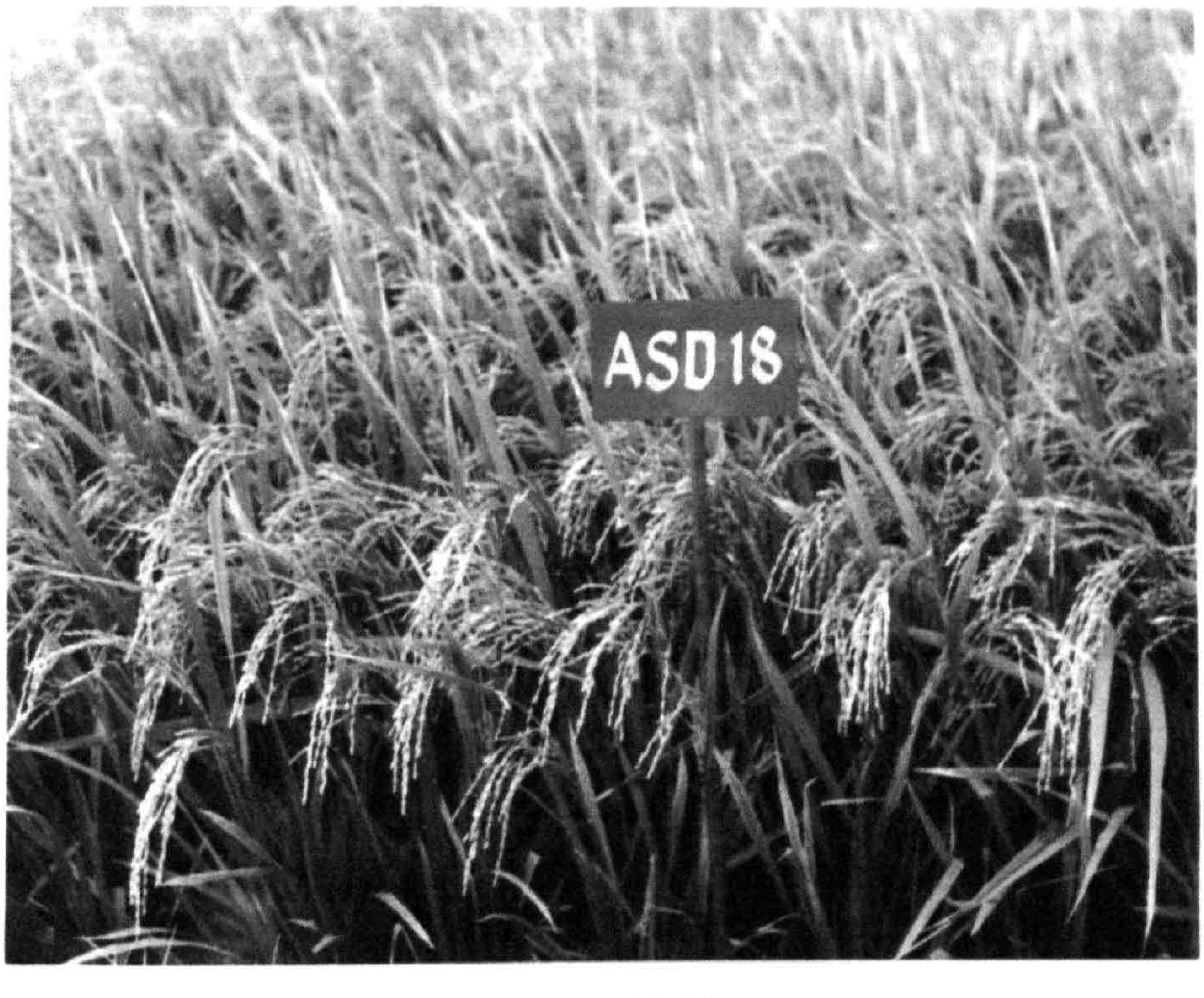
AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

A study was undertaken in principal crops in Palani taluk of Dindigul Quaid-e-Milleth District in 1988-89 to assess the yield gaps in major crops. Results indicated the existence of yield gaps in both irrigated and rainfed crops. The total yield gap ranged from 26.52 per cent to 74.64 per cent. Among the six irrigated crops, paddy IR 50 had no yield gap. Cotton had the highest yield gap of 25% followed by sorghum with 24.65%, groundnut 19%, onion 8.33% and rice (IR 20) 5.87%. Further among the irrigated crops, cash crops had larger yield gap of 22% than cereals (10.17%) and vegetables (8.33%). Under dry conditions the gaps were relatively larger at 82.86%, 30.69% and 27.01% for cash crops, cereals and pulses respectively. A more effective technology transfer together with a crop variety, specific package of managerial practices and elimination of constraints in input supply with special emphasis to dryland crops could help in bridging the yield gaps.

A study on performance of women as entrepreneurs in poultry farm in Namakkal block of Salem district revealed the following. Sixty poultry farms were managed by women. Eighty five per cent participated as entrepreneurs in poultry production. More than 80% of the sample respondents were involved in the management activities, with similar proportion as in entrepreneurship. More than 13% of the women were involved in supervision of the farms and this percentage was higher in the higher income farms. Average number of birds per farm amounted to 1420 for the sample. Among different items of cost, feed cost formed the major variable input cost accounting for 81.7%. Overall cost of production per farm amounted to Rs. 1,95,728. The average total cost of production per bird was Rs. 15.69, while the total cost of production per 100 eggs amounted to Rs. 44.64. The enterprise generated an employment of 620 women days per farm. Employment of family labour in managing the farm was high and formed 46.44% of total labour used. Women were found to be thrifty and more than 75% of women entrepreneurs invested their profit in post offices, banks and

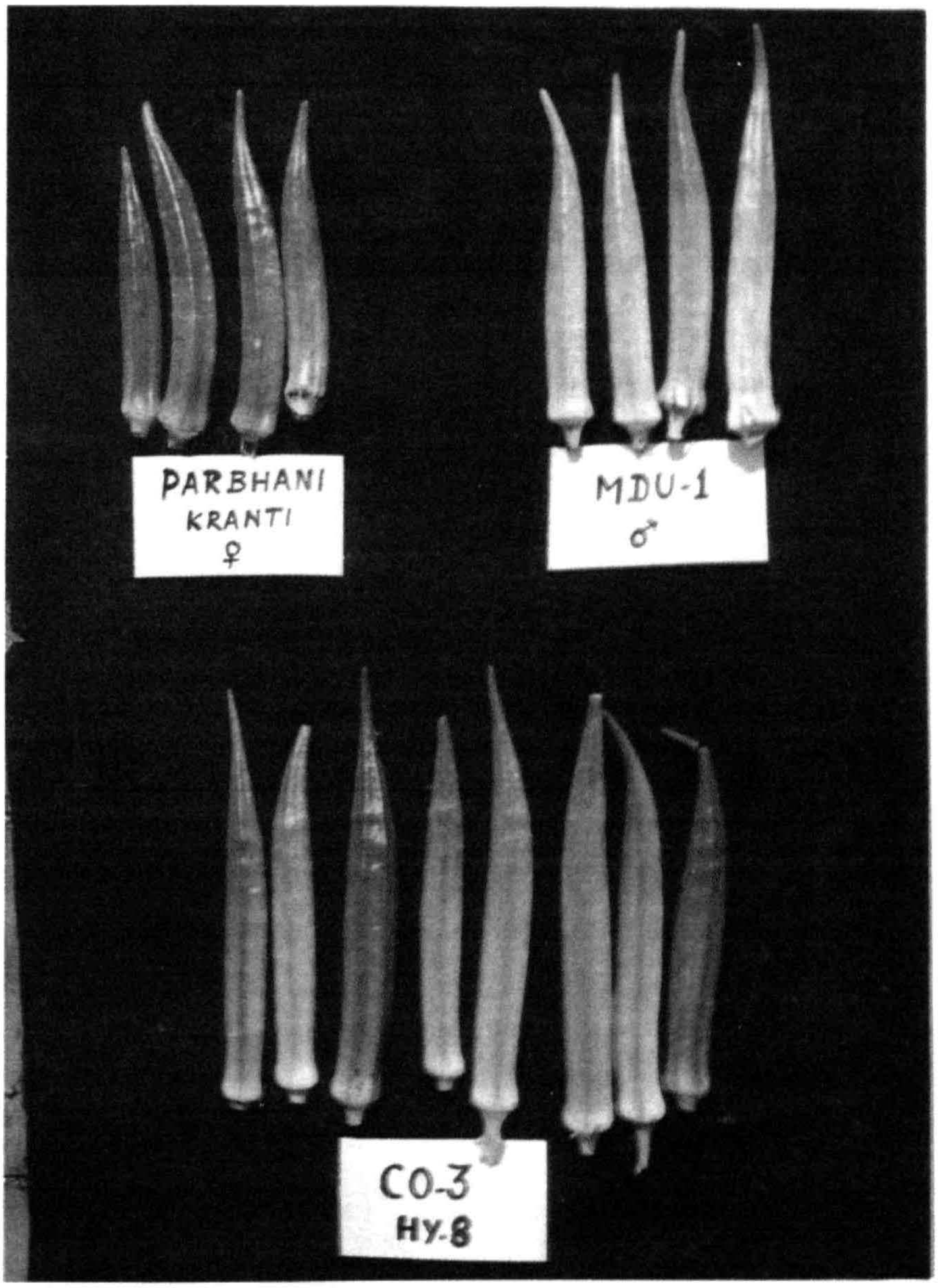
chitfunds, while 72% of farm women invested in poultry enterprise. Entrepreneurs faced dearth of finance, price fluctuation, mortality of birds and scarcity of labour as major constraints. More than 80% of women respondants were optimistic to become successful entrepreneurs and expressed the need for training in various aspects of production, budgeting, sales promotion, organisational use of credit to improve the efficiency. This study implied the need for wide publicity of success stories of these women entrepreneurs to encourage other women to participate in economic activities. Project plans can be formulated by financing institutions to encourage women to take up the poultry farming.

Addition of aquaculture in agriculture could help in boosting farm business income but its high captital requirement is a constraint. The solution of an optimal plan was determined by linear programming. Additional annual returns over variable cost by including aquaculture (0.1 ha) in a farm of 1.6 ha ranged from Rs. 12,513 to 18,230 with a reduction in risk of farm income by 12.5 per cent. Farm labour was used fully to the extent of 369 days. Thus, integrated rice-aquaculture farming could help the rice farmer increase his income and efficiency in resource use with a significant reduction in business risk. These detetminants help in continued sustainable farm business.



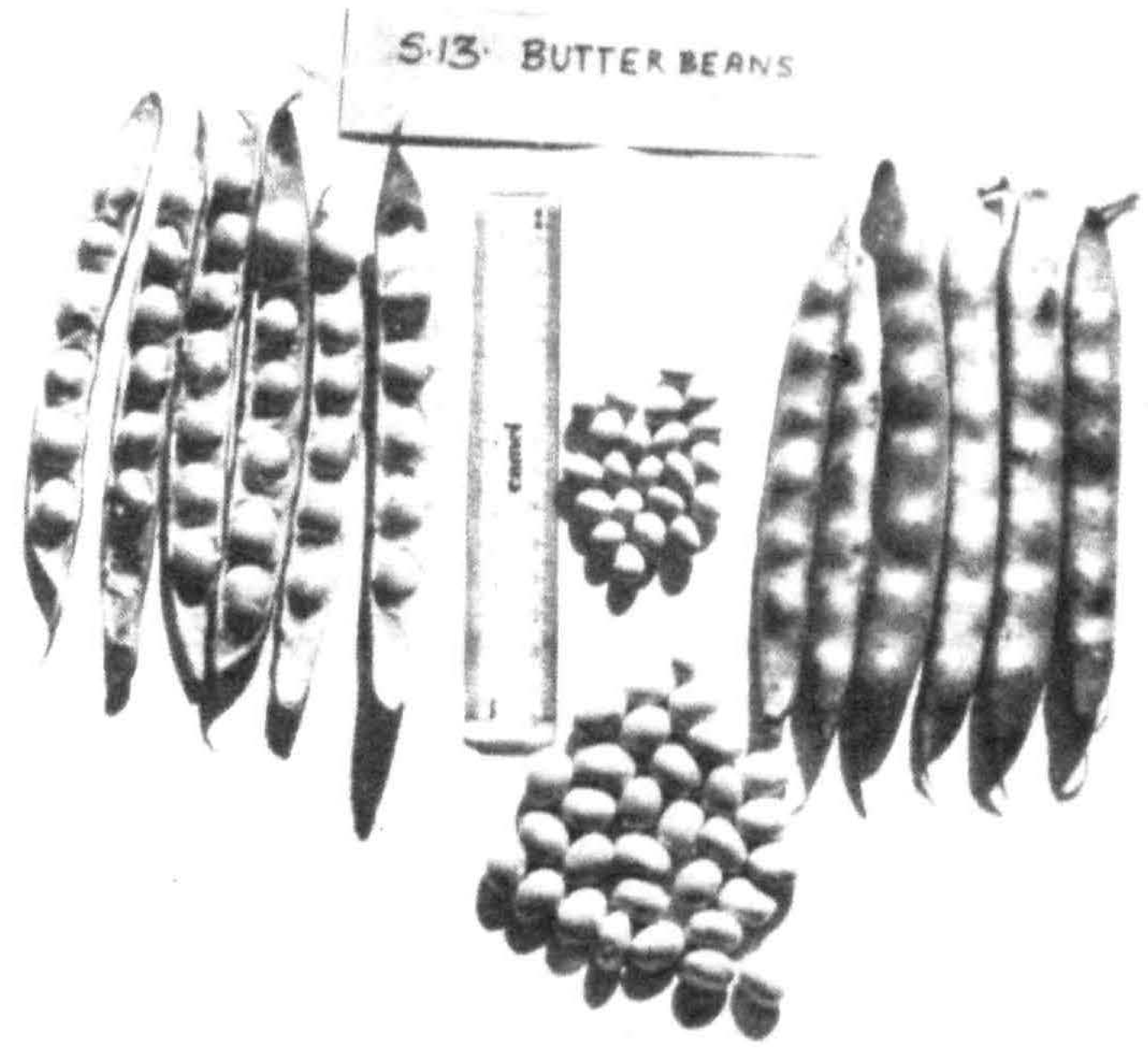
Rice - ASD 18

Redgram - Co 6



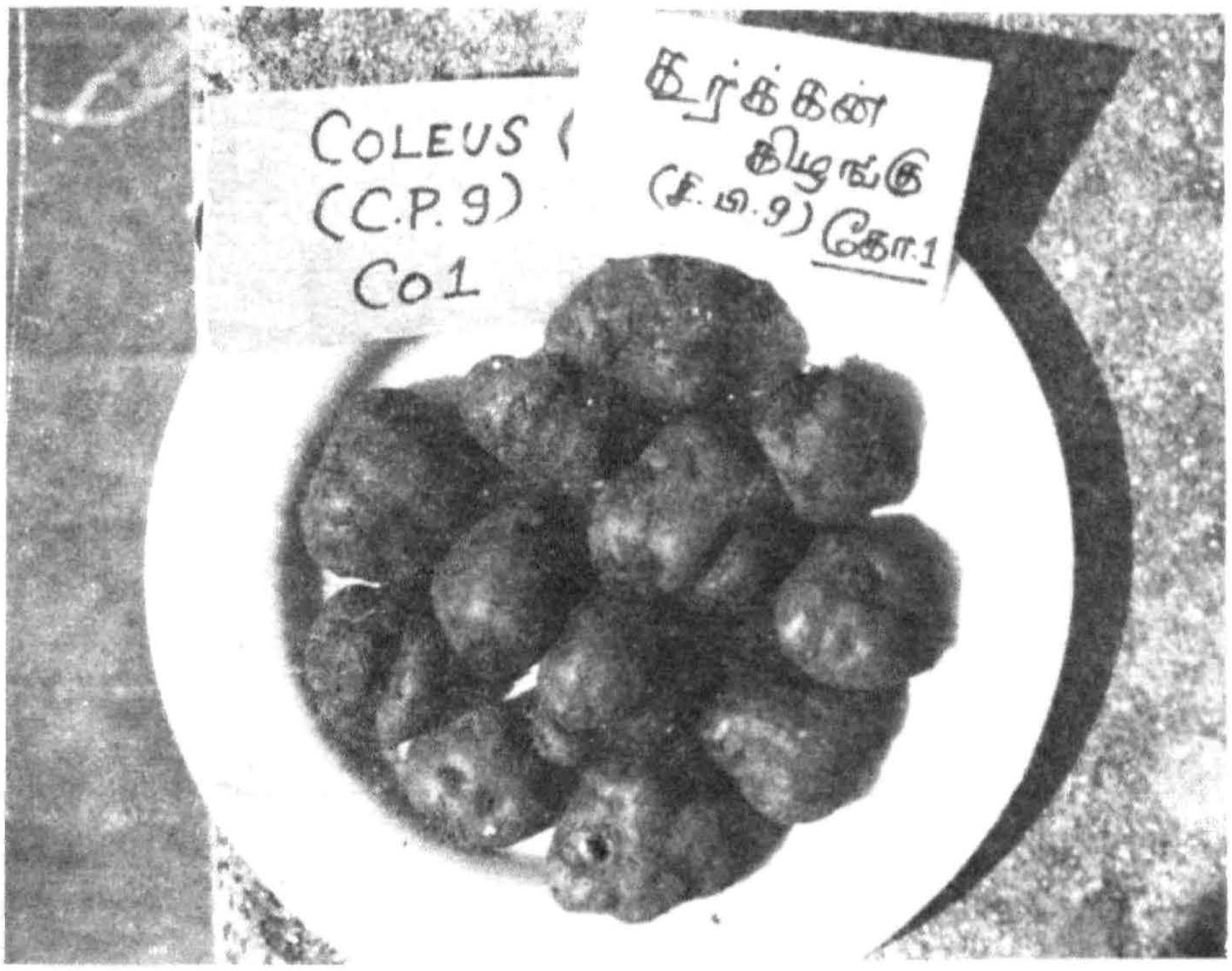
Bhendi - Co 3

Chilli - Co 3

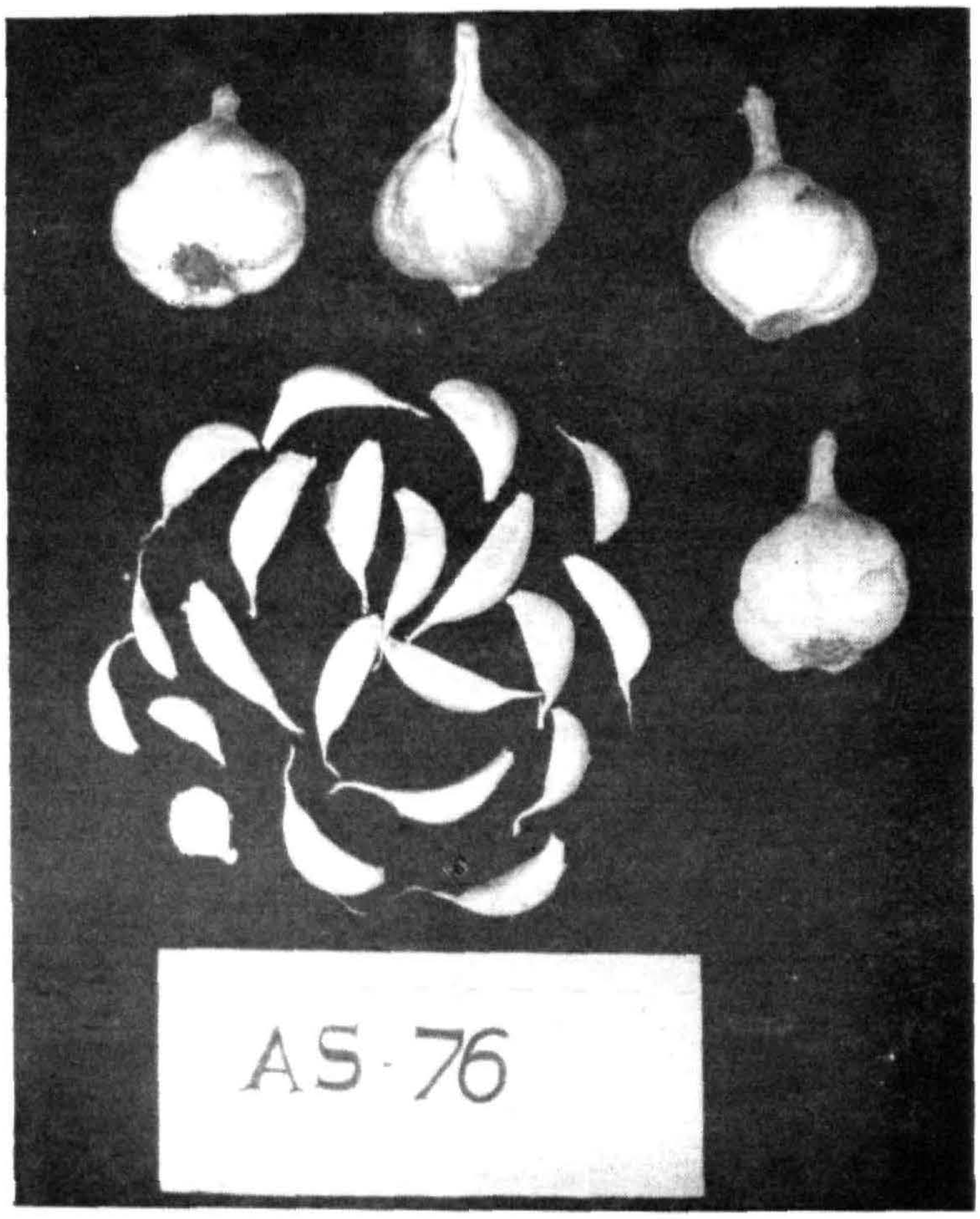


Butter Beans - KKL - 1

Cumbu Napier Hybrid Grass - Co 2



Coleus - Co 1



Garlic - Ooty 1

5. EXTENSION EDUCATION

The Directorate of Extension Education and the various extension education centres of the Tamil Nadu G. D. Naidu Agricultural University are engaged in the transfer of technology emerging from the research programmes of the university. The details regarding the extension education activities of the Directorate of Extension Education are furnished below :

Krishi Vigyan Kendras

The six Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy, Vridhachalam, Kattupakkam and Pondicherry conducted on-campus and off-campus training programmes on agriculture and allied activities. In all 602 training programmes were conducted and the beneficiaries included 10737 farmers, 6282 farm women, 3198 extension workers, 1946 youths and 357 other categories of personnel. In addition, these centres carried out 312 method demonstrations, 35 compact block demonstrations, 196 group/village meetings, 31 farm/field days, 6 farmers' days, 574 farm advisory services and answered 1797 farmers' queries. Besides this, 91 articles were published in dailies and farm magazines, 93 radio programmes/announcements were broadcast over All India Radio. Twenty nine TV programmes were screened for the benefit of the farming community, 41 publications were brought out and 79 slide/film shows were conducted and 76 exhibitions and 52 compaigns were organised as part of the mass media utilisation activity.

Plant Clinic Centres

The scientists of the five Plant Clinic Centres at Vellore, Namakkal, Tirur, Killikulam and Srivilliputhur periodically visited the farmers' holdings, identified pest and disease problems and suggested suitable remedial measures. These clinics also organised programmes for on-farm testing of pre-release cultures of various crops, management practices and plant protection methods besides undertaking surveillance work for the purpose of forecasting the outbreak of pests and diseases. Preparation of calendar for pests and diseases, evolving prediction formulae for important pests and diseases and conducting case studies were the other activities of the Plant Clinic Centres. The Plant Clinic Centres carried out 100 trainings, beneficiaries being 1547 farmers, 445 farm women, 1086 extension workers, 220 youths and 87 others. Besides individual and group contacts, 62 demonstrations, 120 village / group meetings, 3 farm / field days and 4 farmers' days were conducted. These Centres also organised 444 farm advisory services,

answered 320 farmers' queries, published 65 articles in dailies and farm magazines, broadcast 63 radio programmes, released 41 publications and organised 71 slide/film shows, 10 exhibitions and 30 compaigns.

National Demonstration Scheme

The ICAR sponsored scheme functioning at Namakkal organised target oriented demonstrations both under rainfed and irrigated conditions in the farmers' holding for proving the feasibility of achieving maximum output by following various recommended practices. It organised 18 training programmes benefiting 381 farmers, 20 farm women, 7 extension workers, 5 youths and 10 bank staff. The National Demonstration Scheme also organised 14 skill demonstrations, 11 village meetings, 24 field days and a farmers' day. The scientists working in the scheme published 12 articles in dailies and farm magazines, gave 5 radio programmes, organised 2 slide/film shows, 5 exhibitions and 4 campaigns/seminars. During the period under report 12 farm advisory services were rendered and 26 farmers' queries were answered.

Scheme for the upliftment of Scheduled Castes and other Backward Communities

The All India Co-ordinated project on scheduled caste area research functioning at Aruppukottai aims at improving the socio-economic conditions of the scheduled castes besides undertaking efforts to remove the poverty among them. During the period under report group meetings cum method demonstrations were conducted on low cost and no cost technologies in respect of groundnut, paddy and cotton cultivation and mushroom cultivation. The other extension education activities that were carried out include 25 training programmes benefiting 405 farmers, 368 farm women, 250 extension workers, 305 youths and 123 others and 14 method demonstrations, 22 village meetings, publication of 5 articles in dailies and farm magazines. The centre had also organised 4 slide / film shows, 6 exhibitions and 4 campaigns and seminars. Under home science, scheduled caste women were given sufficient training on vegetable cultivation, improving family diet by using locally available foodstuffs, symptoms and causes of nutritional deficiency diseases, need for supplementary food to children and do's and don'ts while cooking. As an income generating activity, oyster mushroom cultivation and nutrition gardening were taken up with a group of selected scheduled caste families. Also it rendered 10 farm advisory services and answered 15 farm queries.

Communication Centre

The Communication Centre at Tamil Nadu G. D. Naidu Agricultural University main campus, Coimbatore disseminated the innovations of the university by various methods. They are in the form of answering 1352 farmers' queries, writing 10 articles in dailies and farm magazines, 29 radio programmes, 70 TV programmes, 15 slide / film shows and organising 5 exhibitions. Nearly 23000

people visited the Central Museum and Central Exhibition and were benefited. The communication centre also conducted distant learning programmes like Farm School on All India Radio and correspondence courses.

Lab-to-Land Programme

Under the lab-to-land programme of the ICAR 300 farm families, adopted during 1989-90, were continued during 1990-91 also in the six TNGDNAU Centres. The six Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy, Vridhachalam, Kattupakkam and Pondicherry were given 50 families each for adoption. Apart from the input support, technological guidance were also rendered on use of improved seeds, seed treatment with Azospirillum for cereals and rhizobium for pulses, seed treatment with bavistin for cereals and pulses against seed borne diseases, enriched farm yard manure preparation, mushroom cultivation, use of bullock drawn seed drill for sowing cholam, integrated pest management for cholam, use of dryland weeders and integrated farming system to increase the income level of the adopted families as a model for neighbouring villages.

Distant Learning Programmes

1. Farm School on All India Radio

During the period under report four courses, viz., integrated farming systems, *women and agriculture, vegetable cultivation and soil fertility were offered.* Nearly 950 farmers registered for the above courses. The contact programmes for the courses, viz., pulses production, pest and disease control and weed management were conducted at the Pulses Research Station, Vamban and Agricultural College and Research Institute, Killikulam respectively. Three hundred registered farmers were benefited directly and thousands of other farmers indirectly. Practical training on the subjects concerned were given by organising skill demonstrations, exhibitions, group discussions, etc.

2. Correspondence Courses

Eight courses viz., sericulture, new plant protection measures in farming, new method of paddy cultivation, cotton cultivation, banana cultivation, forage crops, farm machineries and implements and flower cultivation were offered for which 358 farmers had been enrolled. A three day contact programme on the above courses except farm implements and machinery and flower cultivation was arranged. About 57 registered farmers participated and certificates were awarded to them.

3. Cassette Lessons

Audio cassette lessons on sathugudi, cardamom and pepper cultivation were prepared during the period under report. A total of 113 recorded cassettes on coconut cultivation, tapioca. sericulture, fruits (Part I & II), forage crops, turmeric,

mushroom, sathugudi, cardamom, pepper and sugarcane were distributed to the farming community.

4. Video Production Unit

The video production unit involved in the production of video programmes on agriculture and allied activities in addition to the programmes for telecast through Doordarshan Kendra, Madras. During the period under report 15 general programmes and 33 two minutes Vayalum Valvum programmes were produced and sent to Doordarshan Kendra, Madras for telecast. About 151 pre-recorded video programmes were sold to Agricultural Officers and farmers. Further video coverage was arranged during the important functions of the University.

Training Unit

The Training Unit of the Directorate of Extension Education conducted 40 training programmes benefiting 816 participants. The participants are extension personnel from State Department of Agriculture / Oil seeds / Seed Certification, administrators, defence personnel, scientists of TNGDNAU, NDDB extension personnel etc. Besides this 8 programmes were organised in the Research Stations benefiting 240 Agricultural Officers of the State Department of Agriculture.

Periodicals

1. TNGDNAU Newsletter

This is a monthly journal published by the Directorate of Extension Education. Through this, the latest research findings and various extension activities were highlighted regularly and sent to all the Agricultural Universities, selected research organisations, developmental departments and scientists of India and abroad. At present 1000 copies are printed and distributed.

2. Valarum Velanmai

This is a Tamil monthly journal of the Directorate of Extension Education having 11,000 subscribers. Efforts are taken to increase the circulation of Valarum Velanmai by enrolling more number of life subscribers. Three special issues on Chithirai, Farm Women and Rabbit Rearing were released during the period under report. It published 218 articles covering all the subjects of agricultural science.

TNGDNAU Seithi Madal

This is a Tamil monthly newsletter disseminating the technologies in agriculture and allied subjects relevant to the season, variety and crops among the farming community and other officials of the development departments of the state. This Seithi Madal also carries important aspects such as season and location specific recommendations, new findings, forecasting of pests and diseases,

climatic changes and their impact etc. and functions as an effective tool in transfer of technology. At present 2000 copies are printed and distributed to the convenors of Farmers' Discussion Groups of Krishi Vigyan Kendras, Farmers Training Centres and Officials of the development departments of the state.

Agricultural Information Service

The regular flow of information is ensured to the extension workers and farmers through the Agricultural Information Service which is functioning at the main campus. On all Wednesdays timely and need based messages were processed with the help of scientists and disseminated through all mass media. Besides, this centre also issues daily press notes highlighting the ongoing activities of the university. During the period under report 6421 visitors received information from Agricultural Information Service. Every Wednesday has been identified as the contact day for famers. Proper/regular counselling was given to the farmers with the help of Heads of Departments and the Directors for advisory services.

The messages processed and sent to various media during the period under report are as follows :

	Department	No. of messages given
1.	Agronomy	15
2.	Soil Science	6
3.	Agricultural Entomology	39
4.	Plant Pathology	9
5.	Microbiology	3
6.	School of Genetics	10
7.	Nematology	6
8.	Crop Physiology	5
9.	Seed Technology	2
10.	Agricultural Extension	2
11.	Agricultural Economics	5
12.	Forage Crops	3
13.	Bio-Chemistry	2
14.	Horticulture	1
15.	Agricultural Engineering	9
16.	Water Technology	2
	Total	119

Since 1989 Agricultural Information Service has also been started at each lead centres (RRS) of agro-climatic zones.

Students' Counselling and Placement Centre

This was started with the objective of counselling students to channelise their aspirations in the profession and also to assist them to be properly placed in different jobs. Students were encouraged to go for higher studies. The relevant advertisements collected from dailies/foreign correspondence / national institutes are placed on the notice boards of concerned departments and hostels and the needful counselling of those advertisements was also given to the needy students. The service clubs of various organisations were approached for this purpose. Special lectures were also arranged to facilitate the students to get a deep insight into it.

The centre is also organising coaching classes for IAS and allied services. Based on the syllabus for these competitive examinations, the resource persons from various departments were identified. During the period under report 34 coaching classes for BSRB bank examinations were conducted benefiting 65 students.

The Centre also invited potential employers to the campus for campus interview and conducted 5 campus interviews in Agriculture, Horticulture, Agricultural Engineering and Forestry and suggested names of potential graduates to 74 private firms for placement. The centre had also organised skill oriented training for the unemployed farm graduates on mushroom production, sericulture, mass production of banana seedlings through tissue culture, bio-fertilizer production and food processing. They were also provided with adequate technical support and reading materials.

New Programmes in Extension Education

First Line Demonstration

The First Line Demonstrations on oilseeds and pulses have been started in 1990-91 with the grant of ICAR, New Delhi. The demonstrotions have been organised in farmers holdings under the leadership of Director of Extension Education. The demonstrations have been organised in a block of 5 ha area involving number of farmers. The objective of the scheme is to establish potential of improved technology in increasing productivity of oil seeds and pulses through judicious input management, timely operation, reducing harvesting and post harvesting losses and human drudgery in agricultural operation. The demonstration will be carried out for a period of two years with the same farmers. The activities carried out under First Line Demonstrations organised by the University are furnished in Table I.

Wheat Minikit Trial

Under the Central Sector Scheme, Ministry of Agriculture, Government of India gave directions to Director of Extension Education to conduct Minikit trials for finding out the suitability of the wheat varieties recommended by the Wheat

Research Workers Workshop during the Rabi 1990-91. The varieties recommended are HD 2501 for plains and HUW 318 for hills of Tamilnadu. In all 50 quintals of seeds at 25 quintals in each variety were received and distributed to 18 centres including Krishi Vigyan Kendras, Plant Clinic Centres and research stations of Tamil Nadu G. D. Naidu Agricultural University. The varieties are under trial in different locations of Tamil Nadu to find out their adaptability to different climatic condtions of Tamil Nadu.

Extension Education Activities carried out by the University Research Stations

The various research stations functioning at different parts of Tamil Nadu carried out many extension education activities. They organised 67 training programmes benefiting 650 farmers, 175 farm women, 1421 extension workers, 150 youths and 241 other categories of farmers. They also imparted skill by conducting 32 method demonstrations on latest technologies of TNGDNAU. Besides this they also conducted 7 compact block demonstrations and 123 village/group meetings, 11 farm/field days and 4 farmers' days. They rendered 1314 farm advisory services and answered 3046 farmers' queries. Besides these individual/group contact, as mass media utilisation, 271 articles were published through dailies/farm magazines, 65 radio programmes were broadcast through All India Radio and 37 TV programmes were screened for the benefit of farming community. Publications numbering 216 were brought out, 68 slide/film shows were conducted and 57 exhibitions were organised.

Table I : First line demonstration on oilseeds and pulses

S. No.	Name of the Centre	Ground-nut	Sesa-mum	Sun-flower	Soy-bean	Pulses
		Area in hectares				
1.	Krishi Vigyan Kendra, Coimbatore	10	—	—	5	—
2.	Krishi Vigyan Kendra, Madurai	10	—	10	—	—
3.	Krishi Vigyan Kendra, Vridhachalam	25	6	5	—	—
4.	Krishi Vigyan Kendra, Trichy	30	10	—	—	—
5.	Krishi Vigyan Kendra, Kattupakkam	25	—	—	—	—
6.	National Pulses Res. Centre, Vamban	—	—	—	—	30
7.	Agrl. Res. Station, Pattukottai	—	—	—	—	30
	Total	100	16	15	5	60

Table II : Number of trainings conducted

S. No.	Centre	No. of trainings	Beneficiaries (Number)				
			Farmers	Farm Women	Extn. Workers	Youths	Others
1.	Krishi Vigyan Kendra Coimbatore	95	2316	1568	354	400	122
2.	Krishi Vigyan Kendra Madurai	90	2225	1200	336	350	115
3.	Krishi Vigyan Kendra Trichy	87	1754	985	1491	243	—
4.	Krishi Vigyan Kendra Vridhachalam	179	1576	1061	372	393	54
5.	Krishi Vigyan Kendra Kattupakkam	131	2456	1050	376	317	—
6.	Krishi Vigyan Kendra Pondicherry	20	410	418	269	243	66
7.	Plant Clinic Centre Vellore	13	80	61	222	76	87
8.	Plant Clinic Centre Namakkal	21	234	145	385	—	—
9.	Plant Clinic Centre Tirur	12	270	50	150	—	—
10.	Plant Clinic Centre Killikulam	30	550	145	220	80	—
11.	Plant Clinic Centre Srivilliputhur	24	413	44	109	64	—
12.	SC OBC Scheme Aruppukottai	25	405	368	250	305	123
13.	National Demonstration Scheme, Namakkal	18	381	20	7	5	10

Table III : Mass media utilisation programme

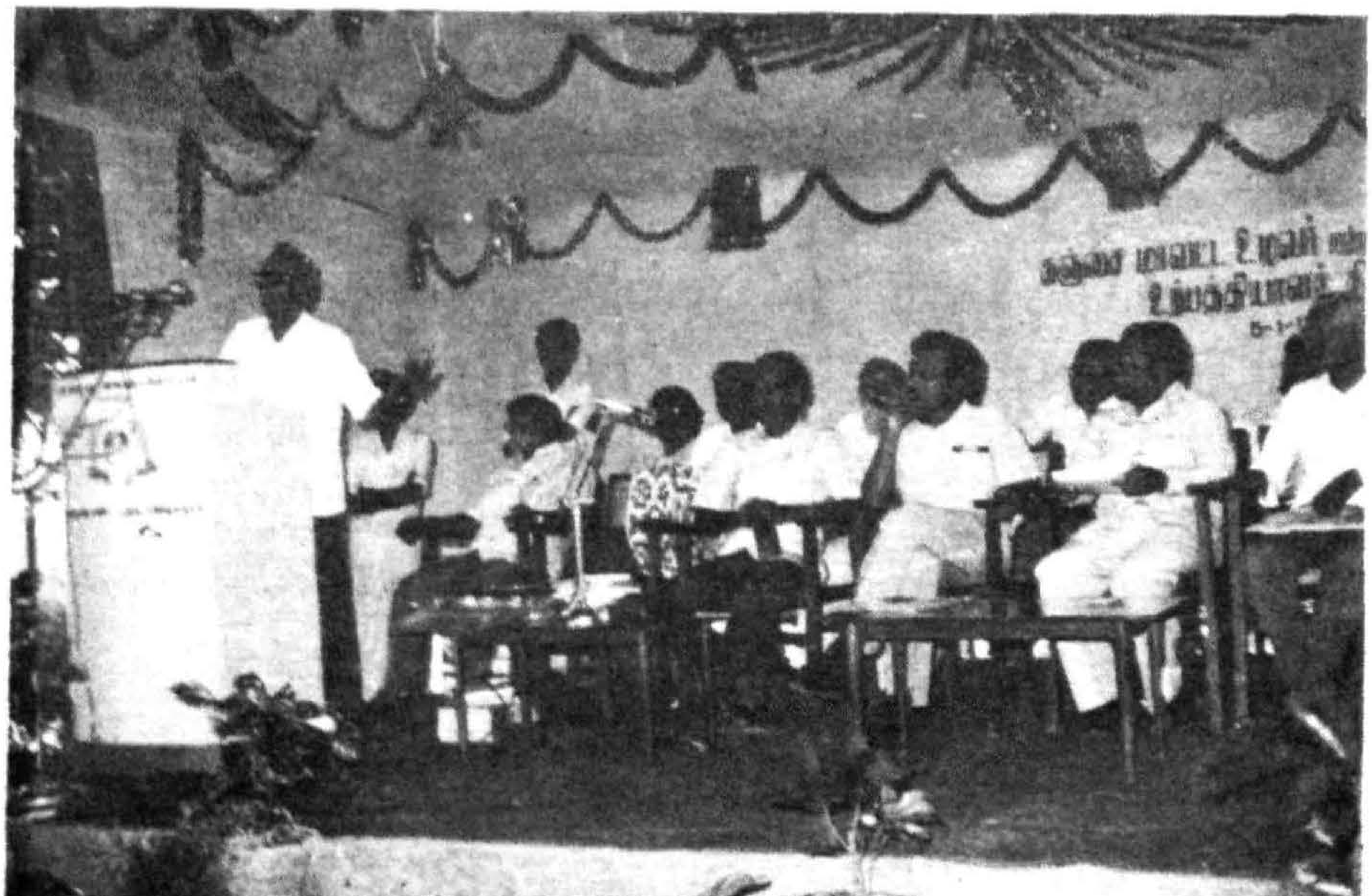
No.	Centre	Writing to dailies & farm magazines	Radio programmes	TV programmes	Publications brought out	Slide/ film shows	Exhibitions	Campaigns/ seminars
1.	Krishi Vigyan Kendra Coimbatore	22	19	7	10	6	21	9
2.	Krishi Vigyan Kendra Madurai	20	28	—	14	18	10	6
3.	Krishi Vigyan Kendra Trichy	8	6	—	1	15	12	11
4.	Krishi Vigyan Kendra Vridhachalam	27	21	18	4	8	15	6
5.	Krishi Vigyan Kendra Kattupakkam	6	12	4	6	20	9	5
6.	Krishi Vigyan Kendra Pondicherry	8	7	—	6	12	9	15
7.	Plant Clinic Centre Vellore	17	8	—	9	3	1	2
8.	Plant Clinic Centre Namakkal	19	9	—	4	60	2	14
9.	Plant Clinic Centre Tirur	9	11	—	2	2	1	—
10.	Plant Clinic Centre Killikulam	8	25	—	12	4	3	12
11.	Plant Clinic Centre Srivilliputhur	12	10	—	4	2	3	2
12.	SC OBC Scheme Aruppukottai	5	—	—	10	4	6	4
13.	National Demonstration Scheme, Namakkal	12	5	—	8	2	5	4
14.	Communication Centre Coimbatore	19	29	70	—	15	5	—

Table IV : Individual / Group contact

No.	Centre	Demonstrations	Compact Block	Village meetings	Farm/Field days	Farmers' Days	Farm advisory services	Queries answered
1.	Krishi Vigyan Kendra Coimbatore	73	3	26	9	1	150	751
2.	Krishi Vigyan Kendra Madurai	77	—	25	8	1	93	650
3.	Krishi Vigyan Kendra Trichy	28	—	44	—	1	62	24
4.	Krishi Vigyan Kendra Vridhachalam	37	24	62	7	3	152	276
5.	Krishi Vigyan Kendra Kattupakkam	82	3	2	—	—	75	32
6.	Krishi Vigyan Kendra Pondicherry	15	5	37	7	—	42	64
7.	Plant Clinic Centre Vellore	14	—	14	—	1	19	102
8.	Plant Clinic Centre Namakkal	7	—	29	—	—	79	29
9.	Plant Clinic Centre Tirur	11	—	21	—	1	105	25
10.	Plant Clinic Centre Killikulam	20	—	46	—	1	229	75
11.	Plant Clinic Centre Srivilliputhur	10	—	10	3	1	12	89
12.	SC OBC Scheme Aruppukottai	16	—	22	—	1	10	15
13.	NDS, Namakkal	14	—	11	24	1	12	26
14.	Communication Centre Coimbatore	—	—	—	—	—	—	1352

Lab-to-Land Programme - Vice-Chancellor distributes farm implements to farmers

Farmers' Day at ARS, Aliyarnagar

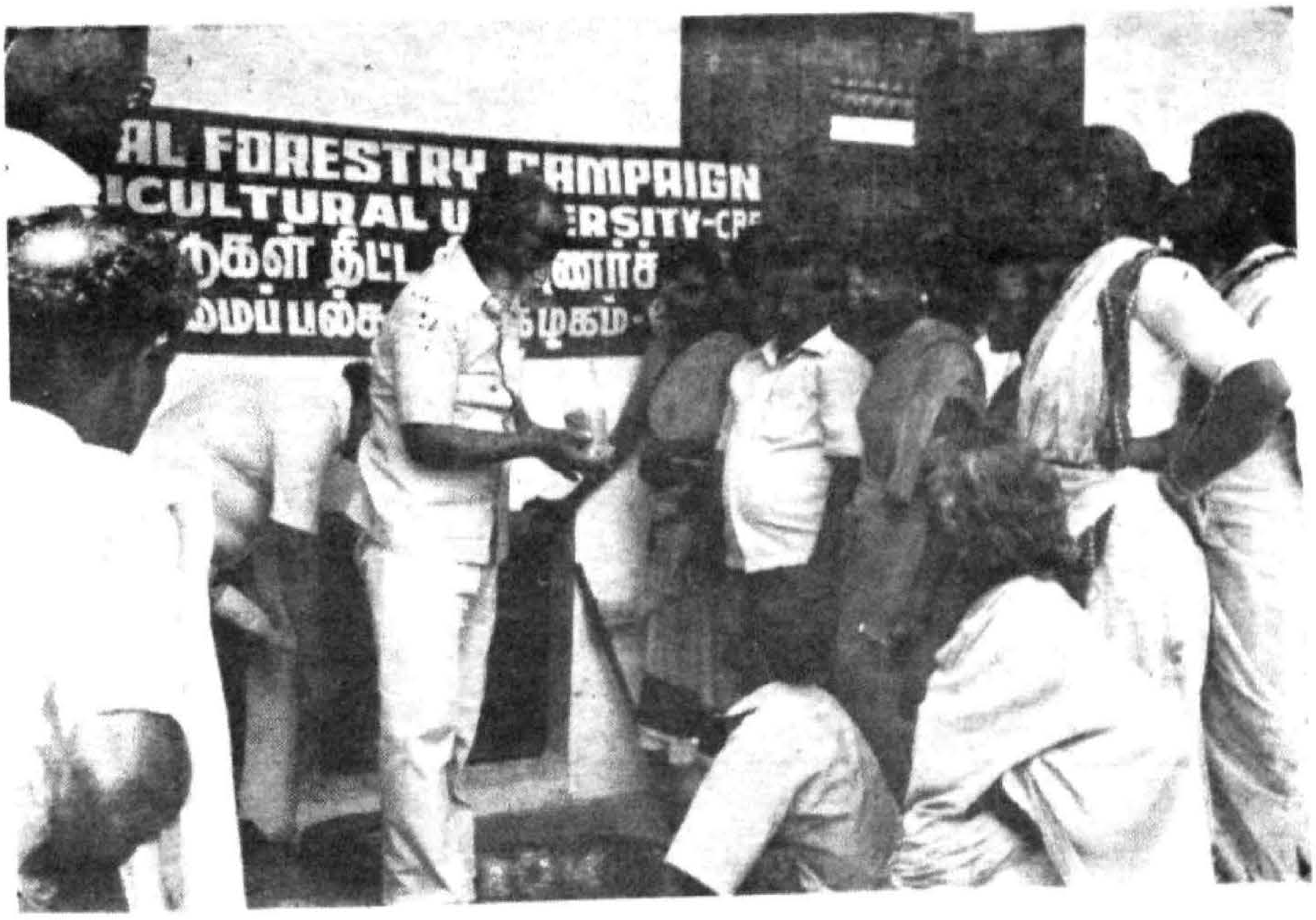


Farmers and farm implements entrepreneurs' Day at TRRI, Aduthurai

Seminar on Cashew Cultivation at RRS, Vridhachalam

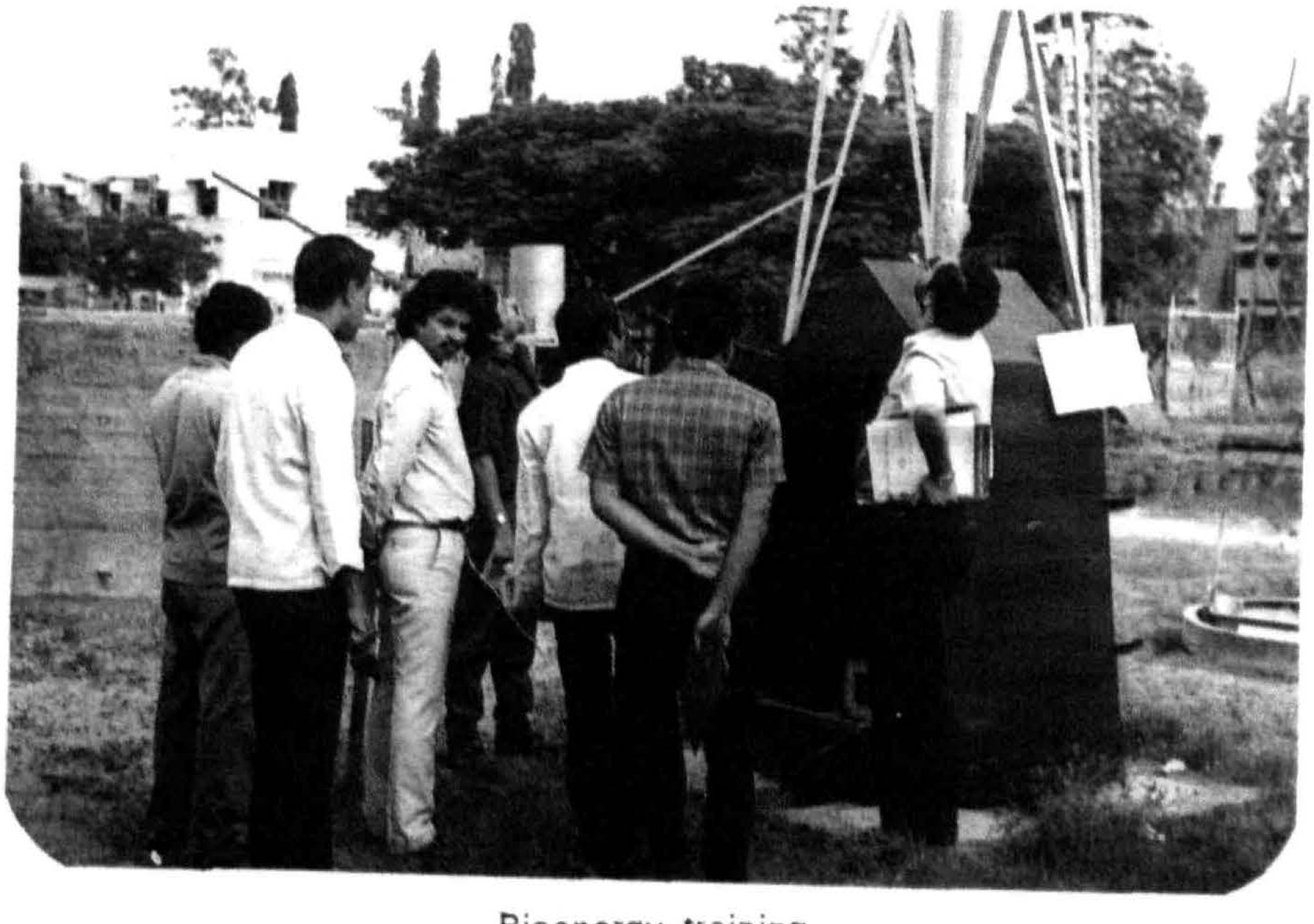
Farmers' Day at Rice Research Station, Ambasamudram. A women farmer receiving the seeds of the newly released rice variety ASD 18 from the Vice-Chancellor

Farmers' Day at ARS, Paramakudi. Demonstration of battery operated sprayer



Social Forestry Campaign

Vice-Chancellor and Director of Research at Rice Research Station, Ambasamudram



Bioenergy training

APPENDIX - I

IMPORTANT CIVIL WORKS COMPLETED

1. Additional construction to the Community Hall, Coimbatore
2. Assistant Professors and Associate Professors room in Ist floor of Comm cation Centre, Colmbatore
3. Construction of one more Guest House (Balance work), Coimbatore
4. Ladies Hostel, Kitchen-cum-Dining Hall, Coimbatore
5. Screen House, Madurai
6. Associate Professor Quarters, Madurai
7. Staff quarters, Periyakulam
8. Rat proof godowns, Aduthurai
9. Training Hall, Aduthurai
10. Glass House, Veppankulam
11. Staff quarters, Veppankulam
12. Staff quarters, Pattukottai
13. Staff quarters, Palur
14. Meteorological observatory, Sirugamani
15. First floor over the hostel block No. I, II, III & IV, Killikulam
16. Kitchen and dining hall, Killikulam
17. Staff room cum laboratory, Killikulam
18. Hostel building. Kumulur
19. Mess building, Kumulur
20. Class room, Kumulur
21. Lab. building, Kumulur
22. Office building and staff quarters, Kumulur
23. Library building, Kumulur
24. Canteen, Kumulur

APPENDIX - II

LIST OF SCHEMES

University Research Scheme - Plan

		1990 - 91 Revised Estimate (Rs. in Lakhs)
1.	Scheme for Breeder Seed Increase, Bhavanisagar	4.52
2.	Scheme for Research on Temperate Vegetables at Vijayanagaram	0.61
3.	Scheme for Research on Temperate Vegetables at Kodaikanal	1.35
4.	Scheme for Research on Temperate Vegetables at Thadiyankudisai	0.54
5.	National Pulses Research Centre, Vamban	6.99
6.	Scheme for the Establishment of Regional Research Station, Aruppukottai	9.48
7.	Scheme for Strengthening and Coordinating Rice Entomological Research, Madurai	4.11
8.	Scheme for Establishment of Plant Clinic Centre at Vellore	1.39
9.	Scheme for Establishment of Plant Clinic Centre at Tirur	1.66
10.	Scheme for Establishment of Plant Clinic Centre, Killikulam	2.39
11.	Scheme for Establishment of Plant Clinic Centre, Srivilliputhur	1.55
12.	Scheme for Establishment of Plant Clinic Centre, Namakkal	1.84
13.	Scheme for Establishment of Regional Laboratory at Trichy	2.11
14.	Scheme for Establishment of Regional Laboratory, Paiyur	2.03
15.	Scheme for Establishment of Regional Laboratory, Yercaud	2.13
16.	Banana Research Station, Virinjipuram	5.24
17.	Scheme for Strengthening and Co-ordinating Rice Virus Disease and Mycoplasma diseases, Madurai	2.56
18.	Scheme for Research on Bunchy Top Virus Disease, Thadiyankudisai	0.93
19.	Scheme for the Improvement of Chillies in Southern districts of Tamil Nadu, Paramakudi	2.54
20.	Scheme for Research on Improvement of Cultivation of Palmyrah Palm, Srivilliputhur	3.79

21.	Scheme for Research on Improvement of Cultivation of Palm, Killikulam	0.20
22.	Scheme for Development of Seed Technology Unit, Madurai	2.12
23.	Krishi Vigyan Kendra, Coimbatore	6.46
24.	Krishi Vigyan Kendra, Madurai	5.66
25.	Scheme for Research on Intensification of Medium Staple Cotton, Srivilliputhur	1.06
26.	Scheme for Research on Intensification of Medium Staple Cotton, Paiyur	0.93
27.	Scheme for Research on Intensification of Medium Staple Cotton, Kovilpatti	0.92
28.	Scheme for Research on Intensification of Medium Staple Cotton, Aduthurai	1 00
29.	Scheme for the Establishment of Centre for Sericulture, Coimbatore	3.25
30.	Scheme for Evaluation of Medium staple cotton for black soil rainfed areas of Southern Districts, Kovilpatti	1.03
31.	Scheme for starting Post-graduate Diploma in Plant Protection, Coimbatore	4.33
32.	Scheme for strengthening of Research on Chemistry of Submerged Soil, Aduthurai	0.98
33.	Scheme for Research on Introduction of New Tree Species, Coimbatore	1.06
34.	Scheme for Research on Introduction of New Tree Species, Mettupalayam	0.46
35.	Scheme for Research on Introduction of New Tree Species, Vamban	0.08
36.	Scheme for Research on Introduction of New Tree Species, Thirunelveli	0.40
37.	Scheme for Vegetable Seed Pioduction, Palur	1.53
38.	Scheme for popularisation of Agricultural Implements through Krishi Vigyan Kendras, Coimbatore	1.12
39.	Scheme for popularisation of Agricultural Implements through Krishi Vigyan Kendras, Madurai	0.80
40.	Scheme for Improvement of Minor Pulses, Madurai	2.34
41.	Scheme for seed production and seed storage studies in sub-tropical and temperate crops, Periyakulam (Kodaikanal, Thadiyankudisai - Sub Centres)	1.62
42.	Scheme for Improvement of Groundnut suitable for rainfed areas, Tindivanam	1.20
43.	Scheme for strengthening post-graduate teaching and research in agricultural marketing management, Coimbatore	1.81

44.	Scheme for Improvement of Forage grasses and Legumes and Pasture Development, Aruppukottai	0.65
45.	Scheme for Improvement of Forage grasses and Legumes and Pasture Development, Erode	0.76
46.	Scheme for Improvement of Forage grasses and Legumes and Pasture Development, Paiyur	0.88
47.	Scheme for Research on Oil bearing tree crops and Sylvagronomical studies on energy fuel yielding wood lots, Aruppukottai	0.63
48.	Scheme for Research on Oil bearing tree crops and Sylvagronomical studies on energy fuel yielding wood lots, Mettupalayam	0.60
49.	Scheme for Formulation of Improved Agro-techniques in grapes suitable for Dharmapuri, Paiyur	1.59
50.	Establishment of Centre for Nematode Pests of Crop Plants, Madurai	1.85
51.	Scheme for Improvement of Brinjal varieties for North and Eastern Regions of Tamil Nadu, Palur	1.35
52.	Establishment of a Seed complex including Seed Health testing and trainings, Bhavanisagar	2.14
53.	Scheme for Strengthening of Seed Production Programme, Pattukottai	0.55
54.	Scheme for starting bio-fertilizer production and quality control unit, Coimbatore	2.09
55.	Scheme for starting bio fertilizer production and quality control unit, Madurai	1.18
56.	Scheme for research and development of forage crops, Coimbatore	0.91
57.	Scheme for strengthening of Coconut Research in Thanjavur, Veppankulam	2.95
58.	Scheme for the establishment of an advance centre for soil and crop management studies, Coimbatore	2.10
59.	Scheme for Strengthening of the Training Division in the Directorate of Extension Education, Coimbatore	2.80
60.	Scheme for studies on production Physiology of Rice, Madurai	0.99
61.	Shceme for the Establishment of Agricultural Research Station, Vellore	3.89
62.	Scheme for Strengthening of Estate Office, Coimbatore	3.01
63.	Scheme for Staring of M. E. (Ag) in Post-harvest Technology, Coimbatore	0.10
64.	Scheme for studies on materials and methods of farm structure, Coimbatore	1.09
65.	Scheme for upgradation of Tamil Nadu Rice Research Institute and Reorganisation of the set up of Directorate of Research, Aduthurai	3.08
66.	Scheme for studies on wilt and button shedding in Coconut, Nagercoil	1.81
67.	Scheme for Development of Breeder Seeds in millets, Kovilpatti	2.19
68.	Establishment of Biological Testing Laboratory, Paiyur	2.50

69.	Scheme for the production of Breeder Seed in Paddy, Aduthurai	3.05
70.	Scheme for Upgrading the Sugarcane Research Station, Cuddalore	4.07
71.	Scheme for Strengthening of Breeding work in Pulses, Pudukkottai	1.36
72.	Scheme for Establishment of an advance Centre for studies on Plant Protection, Coimbotore	3.48
73.	Scheme for Multiplication and distribution of Pulses, Vamban	5.37
74.	Scheme for Multiplication and distribution of Pulses, Tindivanam	0.94
75.	Scheme for Multiplication and distribution of Pulses, Coimbatore	1.87
76.	Scheme for Strengthening of Breeder Seed programme at Vridhachalam	2.57
77.	Scheme for Strengthening of Breeder Seed programme at Tindivanam	2.54
78.	Scheme for Commercial Exploitation of heterosis in Rice, Aduthurai	1.07
79.	Scheme for Strengthening of Radiation Research, Coimbatore	2.02
80.	Scheme for Strengthening the Directorate of Research, Tamil Nadu Agrl. University, Coimbatore	4.88
81	National Agricultural Research Project, Cauvery Delta Zone, Aduthurai	9.07
82	National Agricultural Research Project, Cauvery Delta Zone, Trichy	7 93
83.	Sub Project for Strengthening the Regional Research Station, Paiyur	7.45
84.	Sub Project for Strengthening Regional Research Station, Vridnachalam	4.80
85.	Sub Project for Strengthening Regional Research Station, Cuddalore	0.58
86.	Sub Project for Strengthening Regional Research Station, Tindivanam	2.00
87.	Sub Project for Strengthening Regional Research Station, Kattupakkam	0.18
88.	Sub Project for Strengthening Regional Research Station, Aruppukottai	9.33
89	Sub Project for Strengthening Regional Research Station, Srivilliputhur	0 26
90.	Sub Project for Strengthening the Horticultural Research Station, Thadiyankudisai	7.10
91.	NARP Sub Project at Tirupathisaram	1.52
92.	Fortification of Inbred lines of sorghum with genes for high combining ability and downy mildew resistance, Coimbatore	2.35
93.	Studies on Behavioural control of Polyphagous Lepidopteran pests, Coimbatore	1.10
94.	Micropropagation of Horticultural Crops, Coimbatore	0.67
95.	Developmect of Suitable strains of Azospirillum for commercial Crops, Coimbatore	1.25
96.	Development of model for growth of plants, Coimbatore	1.83
97.	Creation of New Department of Bio-technology, Coimbatore	1.63

98.	Exploitation of hybrid vigour and Development of Superior hybrids in redgram, Coimbatore	1.55
99.	Biological control of soil borne plant pathogens, Coimbatore	1.18
100.	Studies on the decline in the yield of grapes, banana, tomato and brinjal due to nematode and fungus complex, Periyakulam	2.17
101.	Improvement of nutritive value of foods utilising specific microbial strains in traditional fermented food, Madurai	1.67
102.	Establishment of Video Library, Coimbatore	2.11
103.	Integrated farming system, Madurai	2.24
104	Water Technology Centre, Coimbatore	13.80
105.	Agricultural College, Killikulam	81.20
106.	Establishment of a Separate Division of Publication, Coimbatore	0 94
107.	Setting up a Remote Sensing user cell, Coimbatore	1.00
108.	Scheme for selection of grape cultivars for drought and salt tolerance and standardisation of agro-technique, Coimbatore	0.07
109.	Scheme for Improvement of Minor Tuber Crops, Madurai	0.43
110.	Starting of Post-Graduate programme leading to MBM, Coimbatore	3 27
111.	Scheme for investigation on the Management of Pests and Diseases of Hill fruit and Vegetable crops on the Nilgiris, Ooty	2.16
112.	Scheme for Development of Sugarcane, Madurai	0.83
113.	Scheme for Development of Sugarcane, Melalathur	0.79
114.	Establishment of Laboratory for Survey and Research on Golden Nematodes of Potatoes, Vijayanagaram	3.37
115.	Isolation and popularisation of superior genotypes of Match Wood Trees, Mettupalayam	1 41
116.	Research on dry land horticultural crops in red soil tract, Killikulam	2.54
117.	Seed production practices In upland rice, Paramakudi	0.89
118.	Studies on the Rice of VA-Mycorrhizal fungus in the establishment of P. nutrition of Agricultural and Plantation crops, Coimbatore	0.30
119.	Agricultural Research Station, Ambasamudram	10.21
120.	Management of Virus Diseases of Horticultural Crops, Coimbatore	1.17
121.	Scheme for breeder seed production in groundnut, Vamban	1.35
122.	Evolving new varieties and technology for higher productivity in *casuarina*, Vridhachalam	1.55
123.	Tissue culture technique for forest trees, Mettupalayam	1.25
124.	Evaluation of scented and non-scented rices, Aduthurai	0.85
125.	Development of sorghum varieties for various industrial purposes, Vellore	1.10
126.	Studies on the Improvement and management of sweet oranges, Periyakulam	0.80

127.	Mitochondrial DNA and proteins in cytoplasmic male steriles in sorghum, Coimbatore	0.70
128.	Development of monoclonal antibodies for RTV in rice and CMV and BBTV in banana, Coimbatore	1.55
129.	Technology development for wasteland reclamation in coastal area, Cuddalore	3.15
130.	Mass production and quality control of bio-fertilizer, Paiyur	1.45
131.	Studies on processing technology for soya based foods, Madurai	1.10
132.	Establishment of Seed Technology Unit, Killikulam	2.00
133.	Resource inventory for Tamil Nadu using remote sensing technique, Coimbatore	2.65
134.	Studies on seed crop management practices under dryland conditions, Aruppukottai	0.85
135.	Biofertilizer research for forest system in Western Ghats, Kodaikanal	0.95
136.	Strengthening foliar diagnosis research to alleviate nutritional and physiological disorders in crop plants, Periyakulam	2.25
137.	Causes for button shedding, nut shrinking and ill filling in coconut, Veppankulam	1.15
138.	Studies on drought climatology, Trichy	1.05
139.	Operational research on pests and diseases management in rice, Kattuthottam	1.65
140.	Survey and management of pests of forests and forage trees, Mettupalayam	0.88
141.	Teaching Science and Technology to farm women through video cassettes, Madurai	0.90
142.	Anbil Dharmalingam College, Kumulur	45.00

Non Plan Scheme (Agriculture)

1.	Scheme for upgrading the paddy experiment station, Ambasamudram	10.21
2	Scheme for establishment of paddy experiment sub-station, Tirupathisaram	3.77
3.	Scheme for establishment of multicrop experiment station, Paramakudi	2.24
4.	Soil and Water Management Research Institute, Thanjavur	11.30
5.	Scheme for improvement of groundnut through induction of mutation, Coimbatore	1.09
6.	Scheme for surveillance of pests and diseases, Vellore	1.24
7.	Scheme for studies on the residues of pesticides in plant and soil, Coimbatore	3.83
8.	Scheme for research on citrus die back, Tenkasi and Coimbatore	1.24
9.	Scheme for improvement of redgram and soybean, Vamban	1.74

10.	Scheme for evolution of cumbu resistant to green ear and ergot diseases, Vamban	1.74
11.	Scheme for evolution of cumbu resistant to green ear and ergot diseases, Kovilpatti	1.74
12.	Scheme for improvement of sunflower in Tamil Nadu, Kovilpatti	2.52
13.	Scheme for coordinated agronomic experiment on sugarcane, Cuddalore	4.93
14.	Scheme for research on nematode parasistes of sugarcane crop, Cuddalore	2.42
15.	Scheme for biological testing of pesticides laboratory, Vamban	0.31
16.	Scheme for biological testing of pesticides laboratory, Kovilpatti	1.49
17.	Scheme for biological testing of pesticides laboratory, Aduthurai	1 22
18.	Scheme for biological testing of pesticides laboratory, Tindivanam	1.61
19.	Scheme for the establishment of paddy experiment station, Tirur	12.27

ICAR Coordinated Research Schemes

1.	All India Coordinated Research Project on Water Management, Bhavanisagar	6.40
2.	All India Coordinated Research Project on Water Management, Madurai	6.10
3.	All India Coordinated Research Project on Oilseeds, Coimbatore	3.36
4.	All India Coordinated Research Project on Oilseeds, Vridhachalam	9.13
5.	All India Coordinated Research Project on Oilseeds, Aliyarnagar	1.74
6.	All India Coordinated Research Project on Oilseeds, Tindivanam	1.85
7	All India Coordinated Research Project on Oilseeds, Bhavanisagar	0.73
8.	All India Coordinated Research Project on Agro-Meteorology, Kovilpatti	2.88
9.	All India Coordinated Research Project on Rice Improvement, Coimbatore	4.68
10.	All India Coordinated Research Project on Rice Improvement, Aduthurai	4.78
11.	All India Coordinated Research Project on Rice Improvement, Madurai	0.55
12.	All India Coordinated Research Project on Forage Crops, Coimbatore	5.00
13.	All India Coordinated Research Project on Small Millets, Coimbatore	4.59
14.	All India Coordinated Research Project on Cotton, Coimbatore	6.08
15.	All India Coordinated Research Project on Cotton, Kovilpatti	2.45
16.	All India Coordinated Research Project on Cotton, Srivilliputhur	3.86
17.	All India Coordinated Research Project on Sorghum, Coimbatore	6.32
18.	All India Coordinated Research Project on Cashew, Virdhachalam	2.67

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19.	All India Coordinated Researdh Project on Jute and Allied Fibres, Coimbatore	1.36
20.	All India Coordinated Research Project on Tuber Crops other than Potatoes, Coimbatore	2.61
21.	All India Coordinated Research Project on Vegetables including Chillies, Coimbatore	3.36
22.	All India Coordinated Research Project on Post Harvest Technology in Horticultural Crops, Periyakulam	3 79
23.	All India Coordinated Research Project on Energy requirement in Agricultural sector, Coimbatore	6.89
24.	All India Coordinated Research Project on Farm Implement and Machinery, Coimbatore	13.89
25.	All India Coordinated Research Project on Plant Parasite Nematode with Integrated Approach for their Control, Coimbatore	2.45
26.	All India Coordinated Research Project on Long Term Fertilizer Experiment, Coimbatore	1.04
27.	All India Coordinated Research Project on Improvement of Soil Physical Conditions to Increase Agricultural Production of Problematic Areas, Coimbatore	3.37
28.	All India Coordinated Research Project on Micro and Secondary Nutrients and Pollutant Elements in Soils and Plants, Coimbatore	3.75
29.	All India Coordinated Research Project on Investigation on Correlation of Soil Test with Crop Response, Coimbatore	4.59
30.	All India Coordinated Research Project on Agronomic Research, Coimbatore	3.40
31.	All India Coordinated Research Project on Agronomic Research, Pudukkottai	
32.	All India Coordinated Research Project on Agronomic Research, Tirur	2 10
33.	All India Coordinated Research Project on Agronomic Research, Thanjavur	1.40
34.	All India Coordinated Research Project on Agronomic Research, Bhavanisagar	2.10
35.	All India Coordinated Research Project on Tropical Fruits, Periyakulam	4.00
36.	All India Coordinated Research Project on Tropical Fruits, Coimbatore	4 55
37.	All India Coordinated Research Project on Soybean, Coimbatore	1.28
38.	All India Coordinated Research Project on Intensification of Research on the Improvement of Pulses, Coimbatore	5.56
39.	All India Coordinated Research Project on Intensification of Research on the improvemnt of Pulses, Vamban	5.87
40.	All India Coordinated Research Project on Biological Control of Crop Pests and Weeds, Coimbatore	1.52

41.	All India Coordinated Research Project on Sugarcane, Guddalore	0.83
42.	All India Coordinated Research Project on Spices and Plantation Crops, Coimbatore	2.75
43.	All India Coordinated Research Project on Spices and Plantation Crops, Yercaud	1.62
44.	All India Coordinated Research Project on Dryland Agriculture, Kovilpatti	5.32
45.	All India Coordinated Research Project on Palms (Coconut), Veppankulam	5.52
46.	All India Coordinated Research Project on Renewable energy sources, Coimbatore	9.32
47.	All India Coordinated Research Project on Post-harvest technology, Coimbatore	6.34
48.	All India Coordinated Research Project on arid fruits, Aruppukottai	3.69
49.	All India Coordinated Research Project on Seed borne diseases, Coimbatore	1.14
50.	All India Coordinated Research Project on Floriculture Improvement, Coimbatore	2.20
51.	All India Coordinated Research Project on Intensive testing of power tiller and research and development of new machine to make them versatile, Coimbatore	2.99
52.	All India Coordinated Research Project on Betelvine wilt disease, Sirugamani	2.01
53.	All India Coordinated Research Project on under utilised/under exploited plants, Mettupalayam	2.12
54.	All India Coordinated Research Project on Mushrooms, Coimbatore	2.07
55.	All India Coordinated Research Project on Acarology, Coimbatore	1.29
56.	All India Coordinated Research Project on pesticide residues, Coimbatore	3.06
57.	All India Coordinated Research Project on Agro-Forestry, Mettupalayam	2.44
58.	All India Coordinated Research Project on Weed control, Coimbatore	2.60
59.	All India Coordinated Research Project on Biological nitrogen fixation, Coimbatore	2.24
60.	All India Coordinated Research Project on Maize, Coimbatore	1.86
61.	All India Coordinated Research Project on Palm, Aliyarnagar	2.58
62.	All India Coordinated Research Project on Palm, Aduthurai	1.51

Scheme Fully Financed by the ICAR

1.	Production of Breeder Seed of Annual Oilseeds Crops, Bhavanisagar	6.23
2.	Production of Breeder Seed of Annual Oilseeds Crops, Tindivanam	1.39

3.	National Seed Project, Bhavanisagar	0.7
4.	Biological Nitrogen fixation by BGA (cyano-bacteria) and Azola under Indo-US collaborative Seed Programme, Coimbatore	1.14
5.	Nitrogen Fertilizer efficiency under Indo-US Senior Scientific Panel Programme, Coimbatore	1.88
6.	Krishi Vigyan Kendra, Pondicherry, Kattupakkam, Trichy and Vridhachalam	23.30
7.	Capital requirement for modernisation of Indian Agriculture, Coimbatore	0.90
8.	Studying the impact of modernisation of agriculture on women with special reference to rice farming system, Coimbatore	0.40
9.	Isolation and identification of antiviral principles in plant extracts and preparation of effective antiviral formulation, Coimbatore	0.31
10.	Breeder Seed Production on vegetables, Periyakulam	6.07
11.	Potato cyst nematodes scheme for investigations on host plant resistance and cultural methods of control, Ooty	0 69
12.	Development of homozygous dihaploid lines from India x Japonica hybrids through androgenesis in rice, Coimbatore	0.52
13.	Evaluation of high yielding fodder types in small millets, Coimbatore	0.46
14.	Lab to land programme for transfer of technology to families, Coimbatore, Madurai, Pondicherry, Trichy, Kattupakkam and Vridhachalam	1.77
15.	Studies on the selection of saline and acid tolerant blue green algae and nitrogen fixation in rice soil eco-system, Coimbatore	0.46
16.	ICAR - adhoc scheme on on-farm demonstration in Annual Oilseeds Crop, Coimbatore	0.09
17.	ICAR - adhoc scheme on on-farm demonstration in Annual Oilseeds Crops, Aliyarnagar	0.40
18.	ICAR - adhoc scheme on on-farm demonstration in Annual Oilseeds Crop, Bhavanisagar	0.28
19.	ICAR - adhoc scheme on on-farm demonstration in Annual Oilseeds Crop, Tindivanam	0.09
20.	ICAR - adhoc scheme on on-farm demonstration in Annual Oilseeds Crop, Vridhachalam	0.74
21.	ICAR - adhoc scheme on on-ferm researches on soybean, Coimbatore	0.11
22.	Scheme on development of methods for management of virus diseases of greengram and blackgram, Coimbatore	1.33
23,	All India Coordinated Research Project on Pearmillet Improvement off season nursery, Coimbatore	1.98
24.	All India Coordinated Research Project on National demonstration on major food crops, Namakkal	1.54

25.	All India Coordinated Research Project on rapid improvement of agricultural technology directed at socio-economic upliftments, Aruppukottai	2.35
26.	Adaptive Research on Sugarcane, Cuddalore	9.55
27.	Isolation and characterisation of microbes involved in stable soil aggregation, Coimbatore	0.60
28.	All India Coordinated Rice Improvement Project, Pondicherry	2.32
29.	Diversification of male sterile lines in pearl millet, Coimbatore	1.24
30.	Promotion of Research and Development efforts in Hybrids in selected crops, Sunflower, Pigeon pea, Rice, Pearl Millet-Coimbatore	7.30
31.	Promotion of Research and Development efforts in Hybrids in selected crops, Sunflower, Pigeon pea, Rice, Pearl Millet-Bhavanisagar	2.43
32.	Promotion of Research and Development efforts in Hybrids in selected crops, Sunflower, Pigeon pea, Rice, Pearl Millet-Tindivanam	1.67
33.	Agro-techniques for maximising yield in chewing tobacco in Western Ghats, Bhavanisagar	1.02
34.	Biological control of a few major insects pests associated with Sugarcane, Coconut, Banana, Mango crops by using entomophlic nematodes, Madurai	0.53
35.	Alternative model for T & V system - CARDS, Coimbatore	1.27
36.	Methodology for early detection of Thanjavur Wilt of Coconut, Veppankulam	0.90
37.	In vitro culture studies on the improvement of banana clones, Periyakulam	1.26
38.	ICAR Scheme - First line demonstration on oilseeds crops during rabi 1990-91, Krishi Vigyan Kendras, Coimbatore	4.48
39.	Studies on seed collection, processing and standardisation of storage practices in sylvicultural crops of economic importance, Forestry Res. Station, Mettupalayam	1.14
40.	First line demonstration on pulse (Rabi / summer crop) - blackgram and greengram in Thanjavur and Pudukottai district (Pudukottai and Pattukottai)	1.14

Government of India Schemes

1.	Comprehensive scheme for studying the cost of cultivation of principal crops in Tamil Nadu, Coimbatore	26.88
2.	Scheme for setting up of Regional Centre for development of biogas, Coimbatore	6.02

3.	Scheme for rice processing and allied equipments, Coimbatore	0.4
4.	Scheme for establishment of plasticulture development, Coimbatore	0.98
5.	Production of coconut plants through tissue culture techniques, Coimbatore	0.16
6.	Scheme for establishment of Regional Centre for fuel efficient stove technology, Coimbatore	3.33
7.	Scheme for establishment of bio-energy centre, Coimbatore	4.26
8.	Study on black soil region around Adivalli in PAP command area with a view to alleviate soil and water logging problems, Coimbatore	0.96
9.	Post graduate education and training programme leading to M.Sc. degree in Agriculture Bio-technology under DBT postgraduate, Coimbatore	2.60
10.	Establishment of an advanced centre for training in water management technology, Coimbatore	7.08
11.	Environment protection by developing relation between vegetation stream flow and ground water in Kodaikanal, Coimbatore	0.81
12.	Establishment of user centre at Tamil Nadu Agricultural University Coimbatore under Bio-technology Information System (BTIS)-a National Infrastructural facility, bio-technology unit	0.56
13.	Biological control of insect pest through bio-technology, Coimbatore	15.31
14.	Biological control of root rot diseases of pulses and oil seeds and mass multiplication of antagonists, Coimbatore	10.55
15.	Establishment of pilot plants for mass production of *Trichogramme* and *Chrusopa* and field studies with genetically improved strains, Coimbatore	6.79
16.	Scheme for comparative studies of sprinklers and drip irrigation methods with conventional surface methods, Bhavanisagar	1.87
17.	Scheme for increasing the biomass of forests tree species by the use of mycorrhizal fungi, Coimbatore	0.81
18.	DNESS - Microbiology of methane production from cattle dung, human waste, piggery waste and sago industry effluent, Coimbatore	3.70
19.	Test kit for fermentative and methanogenic anaerobic, Coimbatore	1.83
20.	Nitrogen fixation and carbon assimilation in stem nodules of Sesbania rostrata, Coimbatore	0.63
21.	Chemical constiuents of Neem and Karanja (Pungam) kernel, Mettupalayam	0.76
22.	Technology Extension Project on Agro-Forestry at Farmers Field, Mettupalayam	1.69
23.	Establishment of Centre for Plant Molecular Biology (CPMP), Coimbatore	172.00

24.	Strengthening of State Land use Board, Coimbatore	12.50
25.	GOI - DBT Scheme on the technology development and demonstration project on bio-fertilizers - blue green Algae, Aduthurai	16.67
26.	Scheme for integrated programme for the development of spices. Scheme for production of foundation seed of Chillies and Minor Spices, Bhavanisagar	1.00
27.	I.C.F.R.E. - Exploitation of symbiotic nitrogen fixation of actinorhizal plants for afforestation and soil rehabitation, Mettupalayam	2.44
28.	DBT-Project for selection and Cloning of Hyper Ligninolytic *Streptomyces* sp. for conversion of lignin rich waste (coir dust) to Energy Chemicals and Humus like Polycondensates, Coimbatore	2.10
29.	Production of Fruits and Vegetables, Coimbatore, Palur, Periyakulam	5.00
30.	DNES - Project of degradation of Fatty Acids by Syntrophic Cocultures in Biogas, Coimbatore	5.47
31.	Scheme for Characterisation of Translucent Prefab dome of fixed dome biogas plants in relation to selective Electromagnetic Wave Length Filtering and in particular, Coimbatore	3.00

International Collaborative Scheme

1.	Scheme for Sesamum Research, Coimbatore	0.11
2.	Scheme for Sesamum Research, Vridhachalam	1.93
3.	National Workshop on Ground Water Management, Pilot Study, Coimbatore	0.40
4.	Development and use of Indigenous microbial pathogen for the control of *Heliothis armigera* and *Spodoptera Litura* in different cropping system in South India, Coimbatore	7.00
5.	Research Project in Collaboration with IFPRI-Transfer of Agricultural Technology and Dynamics of Information flows within the Tech. Sector, Coimbatore	1.05
6.	Rural Infrastructure and Agricultural Growth, Coimbatore	0.98
7.	Response of Major Surface Irrigation Systems to Drought, Coimbatore	1.62
8.	Modelling in Irrigation Investment, Coimbatore	0.88
9.	Stand Alone Fuel Cell Power Plants for Rural Electrification in India, Coimbatore	2.95
10.	Ford Foundation - Communication Net Work on Scaree Water Management, Coimbatore	0.39
11.	UNDP - International Rice Research Institute Scheme - to test rice genotypes under low fertility condition in different rice growing conditions of South and South East Asia, Coimbatore	0.70

12.	INSURF-Sub Net Work Collaborative Research on green manure development and utilisation for Rice Based Cropping System, Coimbatore	1.50
13.	IDRC Scheme - Oil Seed Technology transfer package through Mass Campaign Video Teaching, Demonstration and Small Group Approach, Coimbatore	3.88

Private Agencies Scheme

1.	Coirpith-Research project on utilisation of coirpith in Agricultural Farm, Agrl. College and Res. Institute, Madurai	1.05
2.	Establishment of IFFCO Chair-Professor of Agronomy, Coimbatore	0.96
3.	SPIC Chair of Professor of Soil Science, Coimbatore	1.05
4.	Research project for maximisation of yield in rice, Coimbatore	0.75
5.	Institution of Professional Chair in Agricultural Entomology, Coimbatore	1.01
6.	Scheme for strengthening of coffee teaching and training for undergraduate and post-graduate degree courses in Horticulture, Yercaud	1.53
7.	Studies on the multi-residues of pesticides in spices, Coimbatore	0.54
8.	Scheme for Institution of Chair in Agricultural Marketing Management, Coimbatore	1.31
9.	Investigations on soil and water resources for maximising sugarcane production in Sivaganga unit area of Sakhi Sugars, Madurai	1.32
10.	Studies on the effect of alcohal distillery effluent on soil fertility status, yield and quality of crop produce	1.91
11.	Time Bound Project in Rural Development i) Participation of Rural Women in Development Activities ii) Economics of small scale fishing development activities, Madurai	1.20
12.	Seed fortification and mid storage treatment for prolonging shelf life of crops, Coimbatore	2.68
13.	Social Forestry Education through awareness compaigns, video teaching and direct training to farm women and youth, Coimbatore	2.41
14.	Extension of agro-climatic regional exercise to district level in Tamil Nadu, Coimbatore	1.40
15.	Transfer of Bio-fertilizer Technology of tree crops of social forestry programme for waste land improvement in certain selected areas of Tamil Nadu, Coimbatore	2.54
16.	Developing *Azospirillum* and *Azotobacter* bio-fertilizer for mulberry, Regional Res. Station, Paiyur	2.12

17.	Investigation on the quantitative and qualitative increase in the yield of mulberry, Regional Research Station, Paiyur	2.70
18.	Studies on foliar application of micro-nutrients to mulberry and its effect on economic characters on silk worm, Coimbatore	2.80
10.	Investigations on polyhedrosis virus diseases in *Bombyx Mori* and their management, Coimbatore	9.72
20.	Collaboiative Research Project on Tapioca, Palur	1.00
21.	Scheme for Spices Development in Selected crops, Periyakulam	0.80
22.	TNSCST - Scheme for Ecobehavioural Studies on the White fly *Bemisia tabaci G* in polycrop ecosystem	0.41

State Government Schemes

1.	Hill area development scheme - The Nilgiris district - Use of microbial processes for restoraiion of shola forests in Nilgiris	0.63
2.	NAWPRAG - National watershed development programme for Rainfed Agriculture - Conduct of Adaptive trial, Regional Research Station, Paiyur	0.34
3.	Farm Water Management Studies on command area development programme, Agrl. Research Station, Bhavanisagar	3.68
4.	Production and distribution of vegetative hedge, fodder crops and fruit seedlings and pruning training, Aruppukottai	2.78
5.	Training programme on improved chulas in the Department of Bio-energy, Coimbatore	0.58

APPENDIX - III

LIST OF BOOKS / BOOKLETS PUBLISHED

English

1. Integrated plant protection methods for sugarcane
2. A guide for sugarcane plant protection
3. Hand book of hybridisation technique and plant breeding methods in millets
4. Botany of fruit crops
5. Bulletin on recent advances in micronutrient fertilization
6. Introduction to soil analysis
7. Modern rabbit production
8. All about weed control
9. Manual of weed management
10. Hand Book of livestock production, dairy farming and forage production.
11. An introductory manual for plant physiology
12. Methods of crop physiology
13. Methods of plant breeding
14. Economic botany
15. Cytogenetics
16. Polyploidy and its evolutionary significance
17. Extension methods and their principles
18. Extension programme building
19. Economics of farm management
20. Rural sociology in extension education

21. Communication of innovations
22. A decade of gall midge research at Madurai
23. Birds of Madurai Agricultural College
24. Introduction to Plant Pathoiogy
25. Physiology of disease resistance in plants
26. Germplasm information system for blackgram
27. Germplasm information system for greengram
28. Gene cloning and gene transfer in plants
29. Agricultural Marketing
30. Farm Management
31. Agricultural Business and Finance
32. System study on on-farm water management in PV command area
33. Pests and disease management
34. Silk worm morpholoy and anatony.
35. Tips to increase production in hill crops
36. Nematode pests of hill crops and their control
37. Diseases of hill crops and their control
38. Integrated pest and disease management in cabbage
39. A training manual for rice production
40. A training manual for sorghum and maize production
41. Basic economics
42. Fodder crops

தமிழ்

1. ஒருங்கிணைந்த பயிர் பாதுகாப்பு
2. வேப்பமரம் – விவசாயிகளின் நண்பன்

3. நெல் உற்பத்தியில் பொட்டாஷ் உரச்சத்து பராமரிப்பு

4. மிளகாய் சாகுபடி தொழில் நுட்பம்

5. வாழை சாகுபடி தொழில் நுட்பம்

6. பருத்தியில் பயிர் பாதுகாப்பு

7. எள் சாகுபடி தொழில் நுட்பம்

8. விதை கடினப்படுத்துதல் - விளக்கக் கையேடு

9. திருந்திய புகையாத அடுப்புகள்

10. சோயா மொச்சை சாகுபடி நுட்பங்கள்

11. காளான் உற்பத்தி

12. உயிர் உரங்கள்

13. ஒருங்கிணைந்த நிலக்கடலை சாகுபடி முறைகள்

14. ஒருங்கிணைந்த எள் சாகுபடி முறைகள்

15. கலப்புப்பண்ணையம்

16. குளிர்கால காய்கறிகள்

17. மரங்கள் வளர்த்தலும் பராமரிப்பு முறைகளும்

APPENDIX IV

List of Research Papers Published

AGRICULTURE

Agricultural Biochemistry

1. Kasthuri, R. and S. Sadasivam. 1991. Studies on protein fractions with reference to batter performance in blackgram varieties. International symposium on proteins in life and environment, January 7 - 11, 1991.

2. Krishnaveni, S. and S. Sadasivam. 1991. Effect of techniques in collection, processing and storage on the quality of papain. International symposium on proteins in life and environment. January 7 - 11, 1991.

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ANIMAL HUSBANDARY

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19	Last	3	year	yea
20	2	2	seats	seat
20	11	3	public accounts	publica ccounts
32	1	9	programmes	programme
45	1	4	have	has
48	Heading	3rd column	recipients	receipients
51	4	2	organisations	organisation
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56	1	3	inaugural	inagural
57	3rd column	Heading	recipients	receipients
61	2	2	disciplines	discipline
65	6	1	crop	cropl
65	6	2	several	severa
66	4	5	dairying	diarying
66	4	5	3 cows + 2 calves	3 cows + calves
69	3	1	conducted	condcted
72	6	5	Phase	Phage
74	6	5	9.7	97
76	2	1	applications	application
78	4	4	nuts/palm/year	nuts/plam/year
79	2	3 & 4	17% over MCU 10	10% over MCU 10
79	4	1	Spray	apray
93	3	9	contents	contens
94	6	1	seeds	seed
98	2	3	holdings	holding
101	3	2	centre	centres